

The use of learning styles in adult learning

Evaluating the use of adult learning styles in two courses of a Masters program at the University of South Australia, unit Systems Engineering & Evaluation Centre



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Executive summary

Formative evaluation of the OTE course

The University of South Australia, unit Systems Engineering & Evaluation Centre in Adelaide liked to have proof that the Learning for Masters of Engineering For DSTO staff (Defence Science and Technology Organisation) (LMEF) program was representative of best teaching practice in postgraduate education, and that the program was meeting the needs of the students. From this perspective, they have asked for an evaluation of two of the LMEF courses. One of these courses is 'Operational Test and Evaluation' (OTE).

When conducting an evaluation study, one can focus on several perspectives. The research of this masters project was aimed at writing recommendations to improve and guarantee the degree in which the OTE course of the LMEF Masters could serve adults with several learning styles now and in the future. The main question of this research project was '*How can the 'Operational Test and Evaluation' (OTE) course of the LMEF Masters program ensure best teaching practice, so that several adult learning styles are addressed?*'.

With 'best teaching practice' the focus in this research project was on adult learning styles and not on, for example how good the lecturer is grounded didactically.

This main question could be answered by looking at the two following sub-questions:

1. What is the quality of the OTE courses of the LMEF Masters program by looking at the degree in which the courses can serve adults with several learning styles?
2. How can the quality of the OTE courses of the LMEF Masters program be improved, by looking at the degree in which the courses can serve adults with several learning styles?



Ch. 1

There were two phases in this research project. In each phase a research question was answered by conducting several activities:



Ch. 3

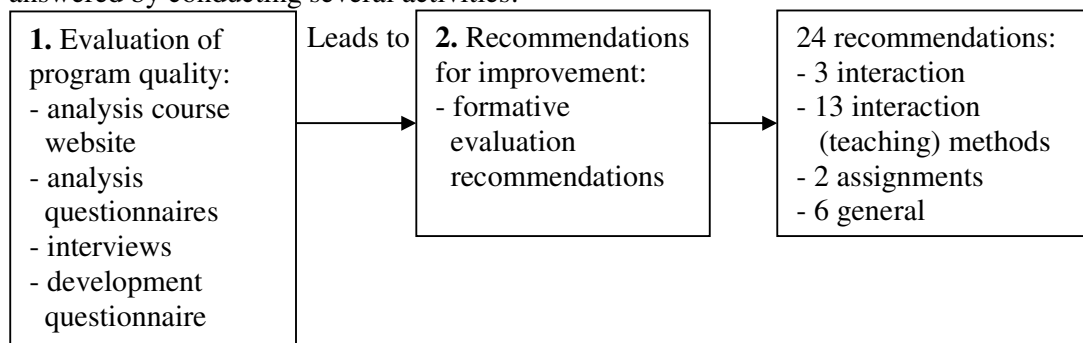


Figure 1. Phases of this research project



Ch. 2

Theoretical framework

Before giving a summary of the most important results related to these research questions, it is important to know something about the used theoretical framework of this research project. A list of characteristics of adult learners was made, based on three adult learning theories. Each of these characteristics resulted in evaluation criteria which were used while evaluating the two courses. Also David Kolb's learning style model was used, because it offered a way to understand individual people's different learning styles.

Characteristics of adult learners

Based on Malcolm Knowles' theory of Andragogy, Carl Rogers' Experiential Learning and Patricia Cross' Characteristics of Adults as Learners model, the following list of characteristics of adult learners was used in this research project:

1. Control of their learning
2. Immediate utility
3. Focus on issues that concern them
4. Test their learning as they go
5. Expect performance improvement
6. Maximise available resources
7. Require collaborative, respectful, mutual and informal climate
8. Rely on information that is appropriate and developmentally paced

Learning styles

In this research project Kolb's Learning Style Model was used. The learning styles taken from this model are: diverging, assimilating, converging and accommodating.

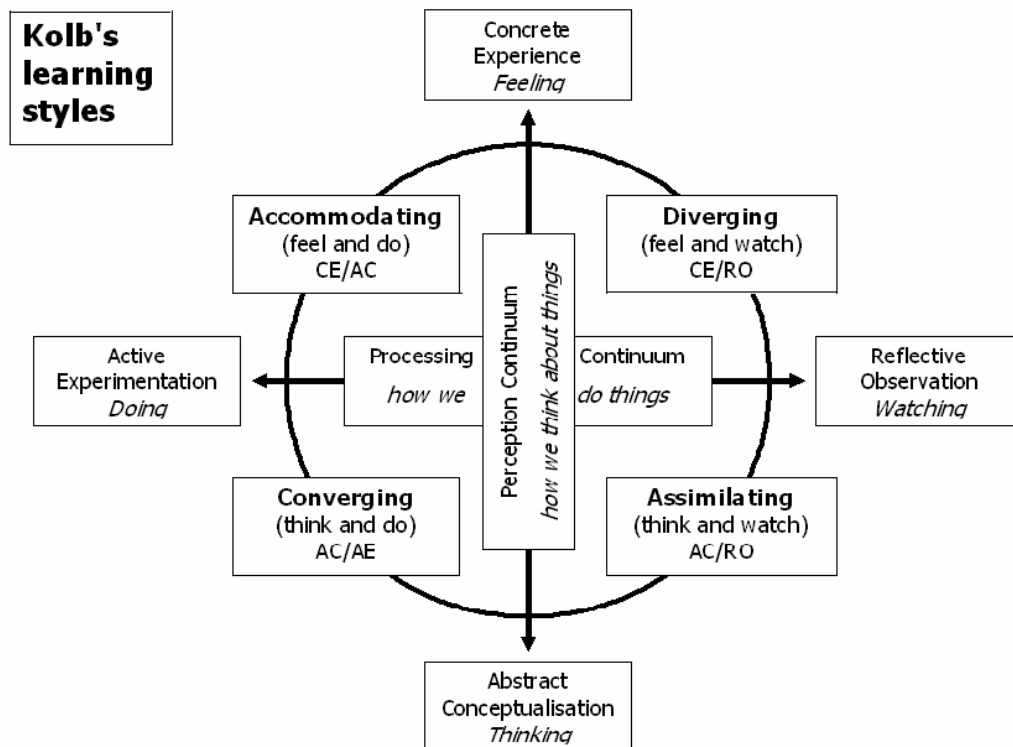


Figure 2. Kolb's learning style model
(Figure from Chapman, 1995-2005)

When using a teaching method, the eight adult learning characteristics should always be taken into account. So, in short the experience (including mistakes) of adults should provide the basis for learning activities. It is advised to use several teaching methods, so that at least each learning style teaching method is present in the course. And as Moran (1997) mentioned, assessing adult learning is not only a matter of matching the learner's preferred style, but also to challenge the learners to move to higher levels. Regardless of which approach or theoretical framework an instructor takes in the issue of learning style, the key is to recognize that differences exist and must be accounted for somehow

in an (online) class (Palloff & Pratt, 2003; Moran, 1997).

This executive summary will give a summary of the most important results related to the evaluation of the *OTE course*.



Ch. 5

Results research question 1

The results of the evaluation phase answered the question: ‘What is the quality of the OTE course of the LMEF Masters program by looking at the degree in which the course can serve adults with several learning styles?’. There were three categories analysed: adult learning characteristics, learning styles and teaching methods.

Table 1.

Results according to the respondents

	Face-to-face students	Online students	Exploration
Overall rating	+	+	
Interaction	+/-	-	More options needed, especially for online students; workshops were very important, online students did not have this option
Materials	+	+	
Feedback	+	+	
Group-work	-	-	In practice it did not work very well; atmosphere needed to be more collaborative, less individual
Teaching methods	+/-	+/-	More options needed
Learning styles	+/-	+/-	More options needed

Results evaluation phase

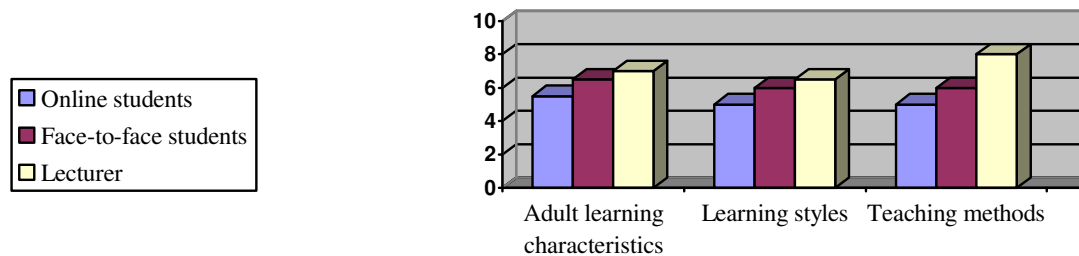


Figure 3. Degree of satisfaction research question 1

These results showed that especially the online students were not satisfied with some aspects of the OTE course; they were more negative than the face-to-face students.

Results research question 2

The recommendations were discussed with lecturers and students in a formative evaluation of the recommendations. It was examined if they thought the recommendations were effective and/or efficient and/or interesting and motivating and/or practical and usable and/or acceptable (Tessmer, 2001). This way it could be made sure that the recommendations fitted with the needs of the students and that they



Ch. 6

were usable for the lecturers. As a result of the formative evaluation of the recommendations, some recommendations could stay the same, some had to be adjusted and some recommendations had to be removed, because they were not going to improve the quality of the course. After that, final conclusions and recommendations were written about implementing adult learning styles, to improve the quality of the OTE course of the LMEF Masters program. No new recommendations were added compared to the formative evaluation of the recommendations. Research question two 'How can the quality of the OTE course of the LMEF Masters program be improved, by looking at the degree in which the courses can serve adults with several learning styles?' can be answered by implementing these adjusted recommendations. They were all written down in an implementation plan.

Main question: Implementation plan



Ch. 7



App. 9

The implementation plan was the answer to the main research question 'How can the 'Operational Test and Evaluation' (OTE) course of the LMEF Masters program ensure best teaching practice, so that several adult learning styles are addressed?'. The implementation plan is written that way, that the lecturers can use the plan individually. Every step that is advised to take, is explained in the implementation plan.

There were two major findings for the improvement of the OTE course, they will be explained in short in this executive summary: *recommendations related to improvement of interaction and the recommendations to improve the group-work*. These are the ten most important recommendations, they are mentioned and explained first. After that, the other recommendations are only mentioned. They are also important, but they are mainly recommendations to improve the use of teaching methods and thus the use of learning styles in the OTE course.

Group-work can be a key factor in making distance courses as good as or better than face-to-face courses (Hiltz & Wellman, 1997, In Turoff et al., 2004). The interaction needed to be improved for especially the online students.

Recommendations in implementation plan

Recommendations with respect to interaction

- It is advised that the lecturer calls the online students at least one time during the course.

This way the online students have real-human interaction, they can ask questions and get instant feedback. This motivates them.

Recommendations with respect to interaction (teaching) methods

- It is advised that the lecturer stimulates the students more to use the discussion board:

- Submitting general feedback on the discussion board.
- Submitting relevant questions asked by one student on the discussion board.
- When a student asks a question on the discussion board, it is advised that the lecturer also gives the other students opportunities to answer that question. This way the lecturer lets the students think for them selves.
- It is advised that the lecturer responds after a couple of days (for example at the end of the week) to the answers given by the student.

When relevant questions asked by one student are submitted on the discussion board, all the students can read the question and the answer given to it. Especially for online students who cannot go to the face-to-face meetings this can be very helpful.

When the lecturer also gives the other students opportunities to answer a question, the lecturer lets the students think for themselves, and not give them all answers straight away without letting them think about the subject.

The lecturer should respond to the answers given by the students, because this way the students know what answers are good and what not.

The lecturer can stimulate the students to make more and better use of the discussion board, by making it clear to them at the beginning of the course that they can improve their grade by participating active on the discussion board. When they submit good and relevant questions and also give good comments on other questions, this will be 2% of their grade. By giving the students a grade for their participation they are more willing and motivated to do it.

- It is advised to make use of a live virtual classroom.

The students and the literature results all found a recommendation about the use of a live virtual classroom important. The lecturer of the OTE course did not like the use of a live virtual classroom. It is still advised to make use of a live virtual classroom for at least two sessions, because for the online students the use of a live virtual classroom is very important. They miss the live interaction and live questioning. For them it is not possible to attend to the classroom session, so to use of the live virtual classroom for at least two times is a good alternative. As a result of this, it is advised to make use of a live virtual classroom.

- It is advised to make use of classroom discussions.

Barton, Heilker & Rutkowski (2005) are saying that classroom discussions function best when students are talking to students. The goal is to get as many students involved in talking to one another as possible and for the teacher to fade into the background. Students are well practiced in how to talk to and listen to teachers, and in how to address and look to authority figures for answers. But they are not well versed in how to talk to and listen to each other, in how to navigate and negotiate and discuss issues of serious consequence and work toward answers among equals.

Students learn through discussions to explore subjects/matters and to deal with people of different backgrounds (Dreikers, Grumwald & Pepper, 1971, In Dempster & Raff, 1992).

- It is advised that at the beginning of each course some time is spent on how to work effectively in groups.

The students should encourage and stimulate each other in the group to have meaningful discussion. The atmosphere should be one in which the students want to learn from each other and share experiences, not to keep everything for themselves. Students should be made aware of the fact they are expected to have a pro-active attitude and contact each other to discuss topics. They should not wait until the lecturer tells them.

- It is advised to submit a document in the e-learning environment of how to work effectively in groups.

Every student should have access to this document. To make sure every student reads this, the lecturer can say in the meetings and write on the website in the schedule 'To improve your grade – download these papers and read them.' This gives the students a reason to read the documents.

- It is advised that the lecturer stimulates group-work, by showing interest in how the group-work is progressing.

During the meetings the lecturer can walk to each group and ask how the group-work is going, if there are any problems. When working on the tutorials and for the online students, the lecturer can call up different members of the groups and ask them how the group-work is going. By calling up different members in a group, and not always the

same person, the lecturer gets a good idea how the group-work is really going.

- It is advised that halfway through working in groups in the course, the students fill in a questionnaire about collaboration.

When using this questionnaire, students have to think about how the group-work is going and what their own role is in the process. When necessary they can change things for the rest of the course to make the group-work, work better.

The lecturer can stimulate the students to reflect on the group-work, by making it clear to them at the beginning of the course that they can improve their grade by participating active in group-work and when they fill in the collaboration questionnaire. When they submit a filled in questionnaire in which it is clear that they have really done their best to reflect on how the group-work is going, this will be 2% of their grade. By giving the students a grade for filling in the collaboration questionnaire, they are more willing and motivated to do it. It is recommended that the collaboration questionnaire will not be marked, but that it is compulsory.

General recommendations

- It is advised to have more face-to-face meetings for the OTE course.

Students can meet and interact with each other in face-to-face meetings. They think that is very important. Now the OTE course is offered as an online course, but students would really like to have face-to-face meetings. The OTE lecturer offered a couple of workshops in his own time, this is really helping the students; they would like to have them even more.

The other recommendations are:

Recommendations with respect to interaction

- It is advised that the lecturer makes a place on the discussion board where students have to submit in short their personal background information.
- It is advised that the lecturer uses the students' background information in the material, so that especially the online students can relate to it.

Recommendations with respect to interaction (teaching) methods

It is advised:

- to structure the discussion board by lesson.
 - that all students and the lecturer receive an e-mail when something has been submitted on the discussion board.
 - to make use of online practice exercises
 - to make use of hyperlinks in an e-learning environment.
 - to make use of simulations, especially role-play and case studies.
- to make use of recorded lectures in an e-learning environment.

It is advised:

- that the written material is more explicit as to what steps need to be taken to complete the assignments.
- that the lecturer submits extra information concerning the assignments on the discussion board.

General recommendations

It is advised:

- to submit more detailed course information on the universities website.
- to put the buttons in the same order.

- to use the same format for the course outline.
- that the lecturer sends all the students an e-mail at the beginning of the course to check if the students can log-in and if they have problems with this, who they can contact. Students should all respond to this e-mail.
- to deliver the learning material two lessons ahead.

To implement the suggested recommendations within the OTE course, the chance of succeeding of the implementation plan depends mostly on the time and effort spent by the lecturer on it. A third critical factor is money, unit SEEC has to invest in the course.

Abstract

The University of South Australia, unit Systems Engineering & Evaluation Centre in Adelaide liked to have proof that the Learning for Masters of Engineering For DSTO staff (LMEF) program was representative of best teaching practice in post graduate education, and that the program was meeting the needs of the students.

The research of this masters project was aimed at writing recommendations to improve and guarantee the degree in which the courses 'Research Methods in a Multidisciplinary Environment' and 'Operational Test and Evaluation' of the LMEF Masters could serve adults with several learning styles now and in the future. The main question of this research project was *'How can the 'Research Methods in a Multidisciplinary Environment' (RMME) and 'Operational Test and Evaluation' (OTE) courses of the LMEF Masters program ensure best teaching practice, so that several adult learning styles are addressed?'*

This main question could be answered by looking at the two following sub-questions:

1. What is the quality of the RMME and OTE courses of the LMEF Masters program by looking at the degree in which the courses can serve adults with several learning styles?
2. How can the quality of the RMME and OTE courses of the LMEF Masters program be improved, by looking at the degree in which the courses can serve adults with several learning styles?

There were two phases in this research project: the first phase was an evaluation phase in which sub-question one was answered. To do this, the two courses 'Research Methods in a Multidisciplinary Environment' and 'Operational Test and Evaluation' given in this master program were explored, a document analysis was made, the curriculum was looked at carefully with a focus on adult learning styles, an interview with the contact person of Defence Science and Technology Organisation, an interview with the coordinator of AITEC, interviews with lecturers and with students were conducted and a questionnaire was developed and sent to the students.

The second phase of this research project was a phase towards the recommendations in which sub-question two was answered. Based on the results of all the activities in the evaluation phase, conclusions and recommendations were written about adult learning styles to improve the two courses. In total there were 34 recommendations. That were three recommendations about interaction, eighteen recommendations about interaction (teaching) methods, five recommendations about feedback, two recommendations about assignments and six general recommendations. The recommendations were discussed with lecturers and students. This way it could be made sure that the recommendations fit with the needs of the students and that they were usable for the lecturers. After that, final conclusions and recommendations were made about implementing adult learning styles, to improve the quality of the courses 'Research Methods in a Multidisciplinary Environment' and 'Operational Test and Evaluation' of the LMEF Masters program. This way, research question 2 was answered. This was all written down in an implementation plan. The implementation plan was the answer to the main research question.

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Foreword

In this report a description is given of a research project that was carried out for the round-off of the master Human Resource Development at the University of Twente, Enschede, the Netherlands. The past months I have been struggling with adult learners and learning styles, which were evaluated in two courses of a Masters program at the University of South Australia.

There are a lot of people who I owe a big thank you. First of all, my supervisor Irene Visscher-Voerman. I really learned a lot from her, not only during this research project, but during my whole study period at the University of Twente. I also want to thank David Cropley for giving me the chance to do my final project at unit SEEC. Although he was very busy, he always found the time to read the reports and findings and provided me with useful tips.

Next to these people, I owe a big thanks to all the other staff members at SEEC, who helped me where possible and who made my stay in Adelaide a really pleasant time. A special thanks to Michael Harris, Paul Bunnik, Melissa Madix and Ian Price for all their help, professionally and personally. Also a big thanks to Lynn Busschenschut. Thanks to her, all the administration before and during my arrival in Adelaide was organized. I also want to thank the people who let me interview them and who filled in the questionnaires. Even though they were really busy with their work, they found the time to help me by giving their opinion, thank you very much! In the Netherlands, there are also a lot of people I want to thank. My family, especially my parents, my friends, my (ex-) house members and my fellow students at the University of Twente.

Last but not least, I want to thank Marieke Klink for joining me on this big adventure to Australia. I really learned a lot from you and even though sometimes it was hard being together all that time, I really enjoyed our time there together!

Chantal Scholten
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1 Introduction

In this research two master courses for the department of Systems Engineering & Evaluation centre (SEEC) of the University of South Australia (UniSA) were evaluated and recommendations for improvement were made. When conducting an evaluation study, one can focus on several perspectives. Because the length of this research project was only a few months and the students attending the two evaluated courses were all adult learners with several learning styles (see for an explanation, chapter 2), this research project was aiming at an evaluation of the degree in which the courses are serving adults with several learning styles in the RMME and OTE course of the LMEF Masters program.

This chapter is an introduction to this research project. In this chapter the context of this research project will be explained in section 1.1. In section 1.2 the intended curriculum will be explained and in section 1.3 the relevance will be discussed. Finally, in section 1.4 the reading guide for this whole report will be given.

1.1 Context

The department of SEEC is a department of UniSA. It runs a master program for the staff of the Defence Science and Technology Organisation (DSTO). SEEC wants to be sure that the Learning for Masters of Engineering For DSTO staff (LMEF) program is representative of best teaching practice in postgraduate education, and, that the program is meeting the needs of the client. From this perspective, they have asked for an evaluation of two of the LMEF courses. The courses to be evaluated were 'Research Methods in a Multidisciplinary Environment' (RMME) and 'Operational Test and Evaluation' (OTE).

Below, in figure 1, a structure of the several stakeholders involved is presented. This is done to make clear what the relationships between the stakeholders involved are.

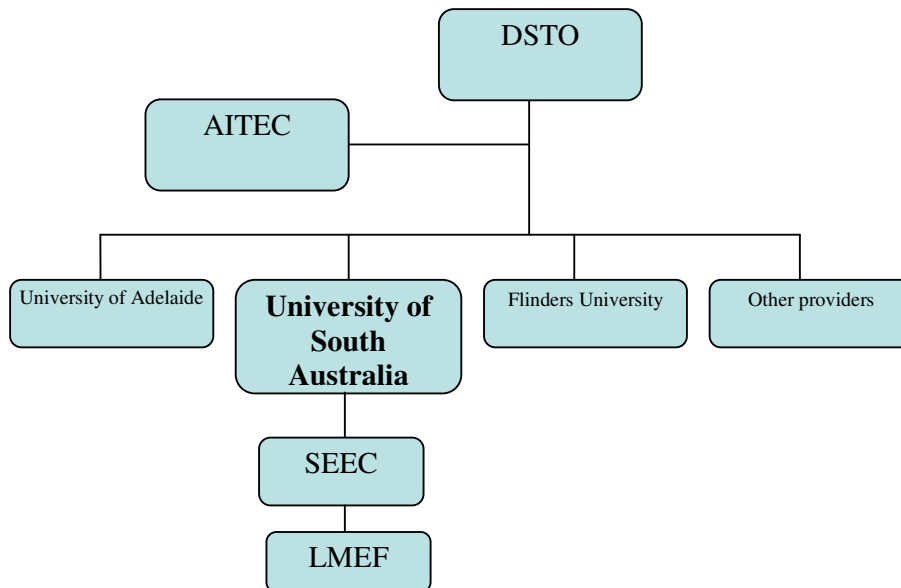


Figure 1. Structure of the organisation

In the following sections the several stakeholders in this research project that are presented in figure 1 are explained. In section 1.1.1 the organisation DSTO will be explained. In section 1.1.2 the organisation AITEC will be explained and in section 1.1.3 the organisation SEEC will be explained. After these organisations are explained, section 1.1.4 will focus on the LMEF Masters Program. In the last two sub-sections the content and the aim/learning objective of the RMME (sub-section 1.1.5) and OTE (sub-section 1.1.6) course will be discussed.

1.1.1 Defence Science and Technology Organisation

The Defence Science and Technology Organisation (DSTO) is part of Australia's Department of Defence. DSTO's role is to ensure the expert, impartial and innovative application of science and technology to the defence of Australia and its national interests.

DSTO has a yearly budget of approximately \$300 million and employs about 2300 staff, predominantly scientists, engineers, IT specialists and technicians.

DSTO has a presence in nearly every state and territory in Australia. It has its corporate office at Defence headquarters in Canberra with research facilities in Melbourne, Edinburgh (near Adelaide), Canberra, Sydney, HMAS Stirling at Rockingham (near Perth), Scottsdale in Tasmania, and Innisfail in northern Queensland.

At all times, DSTO works closely with the industry, science and technology community to enhance its ability to support Australia's defence capabilities and to contribute to national wealth.

1.1.2 AITEC

The Department of Defence has contracted an external organisation, AITEC. AITEC is the organization that provides the liaison and administration between DSTO and UniSA. AITEC is responsible for all aspects of the university enrolment, including payment of fees and graduations, and evaluating the courses and programs.

1.1.3 Systems Engineering and Evaluation Centre

The Systems Engineering and Evaluation Centre (SEEC) is an official research centre within the University of South Australia. The centre was established in 1999 as the successor of the Australian Centre for Test and Evaluation (ACTE). ACTE was founded in 1992 to provide a focus for Test and Evaluation in the Asia-Pacific region.

The centre uses specialised facilities for research and technical staff to work with clients to help them understand their complex systems and improve their practices.

SEEC staff members are experts in understanding and resolving complex problems. SEEC staff represents four key centres of expertise:

- Systems Engineering
- Test and Evaluation
- Capability Development and Acquisition
- Aviation Systems Safety

SEEC offers the following programs:

- Systems Engineering (SE) and Test and Evaluation (T&E) coursework and research degree programs ranging from Graduate Certificate to Doctor of Philosophy (PhD).
- Professional Training Programs, to allow participation in courses without enrolling in a University of South Australia Program.

One of the tailored programs is for DSTO's 'Continuing Education Initiative Masters program' (CEI), a post-graduate education program for existing employees of DSTO. This

part of the program at UniSA is called the LMEF Masters program (a Masters of Engineering).

In total, there are 27 people working at SEEC, including 4 support staff members. Most of these staff members teach and do research. In total 6 staff members of the SEEC staff teach in the LMEF program. Two of them are involved in the courses to be evaluated.

1.1.4 Learning for Masters of Engineering For DSTO staff

To understand the research project, it is important to understand the context. To understand the context one can look at the curriculum. A curriculum can be looked at in different ways. A general distinction can be made between the three levels ‘intended’, ‘implemented’ and ‘attained’ (Van den Akker, 2004). A more detailed overview is given in table 1 (Van den Akker, 2004).

It is important to look at the levels ‘intended’, ‘implemented’ and ‘attained’, because together they can give a clear image of the education offered to the students of the RMME and OTE courses. When looking at these three levels, it can be analysed if the vision, the way the lecturers think and the way the students think are the same about the curriculum.

Table 1
Typology of Curriculum representations

Intended	Ideal	Vision (rationale or basic philosophy underlying a curriculum)
	Formal/Written	Intentions as specified in curriculum documents and/or materials
Implemented	Perceived	Curriculum as interpreted by its users (especially teachers)
	Operational	Actual process of teaching and learning (also: curriculum-in-action)
Attained	Experiential	Learning experiences as perceived by learners
	Learned	Resulting learning outcomes of learners

One of the big challenges for curriculum improvement in general and for this formative evaluation research in particular, is creating consistency between the different parts of the curriculum. One way to look at a curriculum is by dividing the curriculum in components. In this research the ten curriculum components of table 2 (Van den Akker, 2004) were used to describe the two courses RMME and OTE of the LMEF Masters program. Each of the components can be subdivided in one of the three levels of the typology of curriculum representations: intended, implemented and attained. The intended curriculum is explained in section 1.2. The implemented and attained curriculum will be presented in chapter 4 and 5.

Table 2
Curriculum components

Component:	Description:
Rationale	Why are they learning?
Aims & Objectives	Toward which goals are they learning?
Content	What are they learning?
Learning activities	How are they learning?
Teacher role	How is the teacher facilitating learning?
Materials & Resources	With what are they learning?

Grouping	With whom are they learning?
Location	Where are they learning?
Time	When are they learning?
Assessment	How far has learning progressed?

The three organisations discussed above played a role in the LMEF Masters program. In this subsection the focus will be on this LMEF Masters program. In figure 2 the streams of the LMEF program are presented. The LMEF Masters includes two compulsory core courses, Systems Engineering for Complex Problem Solving and Research Methods in a Multidisciplinary Environment (RMME), and six elective technical courses. Operational Test and Evaluation (OTE) is one of those elective technical courses. The LMEF Masters program is mainly offered via online learning. There are also some face-to-face sessions. This combination is also called ‘blended learning’ (Driscoll & Carliner, 2005).



Figure 2. Streams of LMEF Masters program

The two evaluated courses RMME and OTE will be described in the following sub-sections. In this description the curriculum components of Van den Akker (2004) are used.

1.1.5 Course one to be evaluated: Research Methods in a Multidisciplinary Environment

One of the courses that has been evaluated was the RMME course. The content of the RMME course covers:

- The nature of inquiry and the selection of appropriate methods to suit the types of problems encountered by DSTO and the defence sector.
- Research techniques, for example the design of experiments, data validation and interpretation.
- Research design, qualitative and quantitative research, sources of data, data collection procedures, measurement strategies, questionnaire design, interviewing techniques, content analysis, literature surveys, information databases, statistical techniques and evaluation.
- Writing of research reports, papers and theses.
- Development of a research program.

The aim/learning objective for the RMME course is:

- To provide the student with the fundamental concepts and practice of engineering research in a multidisciplinary environment where non-engineering functions may be present.

On completion of the RMME course, students should be able to:

- describe the key elements in the design of research programs;
- appreciate the fundamental concepts of qualitative and quantitative research;
- understand the fundamentals of data collection and research methodology;
- apply skills in gathering and analysing information; and
- apply skills and knowledge of the methods for writing effectively for research degrees.

The lecturer of the RMME course provided six traditional classroom meetings and made use of an e-learning environment. Each classroom meeting took a whole day. The RMME course used a text book. Other readings and materials were provided online. The students were learning mainly individual. During the classroom meetings, the course made use of 7 tutorials (not marked group-work).

1.1.6 Course two to be evaluated: Operational Test and Evaluation

The other course that has been evaluated was the OTE course. The content of the OTE course covers:

- The definition of Operational Test and Evaluation
- Differences from Development and Acceptance Test and Evaluation
- Human factors
- Methods of reporting
- Critical issues
- Statistical confidence levels
- Operational test plans
- Safety and suitability testing
- Operational test reports

The aim/learning objective for the OTE course is:

- To introduce the principles of the specialist discipline of Operational Test and Evaluation.

On completion of this course students should be able to:

- appreciate the elemental components of an Operational Test and Evaluation program;
- appreciate the thrust of Operational Test and Evaluation is a systems-level approach to demonstrating usefulness in achieving users' requirements;
- understand the relationships between the elements of Operational Test and Evaluation;
- understand the differences between Operational Test and Evaluation and other types of Test and Evaluation; and
- understand the human factors affecting Operational Test and Evaluation.

The lecturer of the OTE course provided the course mostly online. In this course there were three classroom meetings scheduled. Each classroom meeting took about 2 hours. The course provided all readings and materials online. In the OTE course the students were learning individual and in groups (tutorials). The course made use of 6 tutorials.

1.2 Intended curriculum

A part of the ideal curriculum of the LMEF Masters program is 'to give independent, expert, professional advice on the application of science and technology to the defence of Australia, DSTO provides DSTO-specific postgraduate education programs for staff.' (Defence Science and Technology Organisation, 2005).

The intended curriculum is specified in the official documents Continuing education initiative, Policy statement DSTO (2005) and Procedures and guidelines (2005). The LMEF Masters program is aiming specifically at maintaining and enhancing DSTO's scientific and technology knowledge base and research capability. This is the rationale according to the interview with the contact person of DSTO, the contact person of AITEC (an external organisation, contracted by the Department of Defence) and the interviews with the students. The LMEF Masters program is a program of part-time postgraduate study in a selected range of scientific and technological disciplines that lead to the award of Graduate Certificate, Graduate Diploma or Masters Degree, or DSTO staff may choose for individual courses. DSTO supports the career development of its entire staff, and recognises continuing education and lifelong learning. These are key ingredients for a successful career in DSTO. DSTO pays the relevant university fees and charges for staff approved to undertake the LMEF Masters program.

1.3 Relevance of the study

DSTO is a very important client of SEEC. SEEC does a lot of work with them, both teaching and research. DSTO invests a lot of money in the unit SEEC, so it is important to keep them satisfied by delivering high quality courses. Another important reason for this research was that the lecturers and the staff know they are giving effective and efficient education; they know that they are doing a good job. By taking part in this research they can get the proof to show this to other people and organisations.

There has never been a research about the way of teaching and cope of the lecturers with the different learning styles of adults, the lecturers do not have the proof that they are doing a good job. Through this research they can demonstrate to other people and organisations that they are serving adults with several learning styles in the best possible way.

The use of learning styles in adult learning

Because in this research project special attention was given to the use of learning styles in adult learning, the first question one can ask him-/herself is: Why is the use of learning styles important in adult learning?

Although the curriculum components can be applied to education offered to children and adults, there are a lot of differences that should be taken into account. Adults have a rich background of knowledge and experience that should be incorporated into the learning process. They learn best when new information or skills build on that past knowledge and experience. Adults, for the most part, are pragmatic in their learning. They want to apply their learning to present situations (Fogarty and Pete, 2004). Learners collect, synthesize, analyze and organize information to add to learning in very different ways (O'Connor, 1997, In Palloff & Pratt, 2003). Learning styles are sometimes described as the personally constructed filters people use to orient their relationships with the world. These filters are influenced by factors such as age, maturity, cultural background, ethnicity and experience, and thus they may change over time. Learners are however more motivated to learn when a variety of

instructional methods are used (Caffarella, 2002). That is why it is important to know more about the students following these courses.

Because ‘different methods of instruction work best for different styles of thought’ (Sternberg 1997, p. 115, In Brennan, McFadden & Law, 2001), differences in learning styles need to be accepted and accommodated in every part - also the teaching methods - of the delivery of education and training of the RMME and OTE courses.

It is relevant to know to what extent learning styles in adult learning were used in the courses RMME and OTE. This way the use of adult learning styles in the two courses can ensure best teaching practice. In this research project it was examined how the learning styles in adult learning of the courses RMME and OTE were already implemented and how the learning styles in adult learning of the courses RMME and OTE could be improved. This was done by a formative evaluation.

So, the main question that was answered in this research project is as follows:

How can the ‘Research Methods in a Multidisciplinary Environment’ (RMME) and ‘Operational Test and Evaluation’ (OTE) courses of the LMEF Masters program ensure best teaching practice, so that several adult learning styles are addressed?

With ‘best teaching practice’ the focus will be on adult learning styles and not on, for example how good the lecturer is grounded didactically.

The main question can be answered by looking at the two following sub-questions:

1. What is the quality of the RMME and OTE courses of the LMEF Masters program by looking at the degree in which the courses can serve adults with several learning styles?
2. How can the quality of the RMME and OTE courses of the LMEF Masters program be improved, by looking at the degree in which the courses can serve adults with several learning styles?

This research project is combined with the research project of Klink (2006). She focused on the use of interaction methods in a blended learning environment. Both research project evaluated the courses RMME and OTE of the LMEF Masters program. Each researcher focused on one perspective and at the end of the research project, these perspectives were combined in writing the recommendations.

1.4 Reading guide

This report is built as follows. In chapter 2 the core terms of both sub-questions are described in a literature research which is coupled to the research project. Chapter 3 defines the methods of research for both sub-questions; chapter 4 and 5 will present the conclusions of the results concerning sub-question one for the RMME (chapter 4) and OTE (chapter 5) course. Chapter 6 will present the results concerning sub-question two for the RMME and OTE course. The last chapters of this report include the justification of the written implementation plan based on the conclusions and recommendations to improve the education of the two courses (chapter 7), and finally a number of discussion points and recommendations for closer research will be presented (chapter 8).

2 Theoretical background

In the previous chapter the main question of this research project has been formulated: How can the 'Research Methods in a Multidisciplinary Environment' (RMME) and 'Operational Test and Evaluation' (OTE) courses of the LMEF Masters program ensure best teaching practice, so that several adult learning styles are addressed?

In this chapter a theoretical background will be developed that helps answering this main question. Also when writing the recommendations to improve the two courses RMME and OTE of the LMEF Masters program, it is important to have more theoretical background. By defining the conceptual framework, the quality of the LMEF Masters program can be determined. To do that, this literature research will help to answer the following questions:

- Which learning theories belong to adult learning?
- Which of the learning style-models is best suited for the two courses RMME and OTE of the LMEF program?
- Which teaching methods are available in adult learning?
- What are the best teaching methods to use in the RMME and OTE courses of the LMEF Masters program according to adults?

The questions mentioned above help to answer sub-question 1: 'What is the quality of the RMME and OTE courses of the LMEF Masters program by looking at the degree in which the courses can serve adults with several learning styles?'

In this chapter the core terms are explained. These core terms are explained, because these terms are used in this research project. Therefore, in section 2.1 different adult learning theories will be discussed. In section 2.2 learning styles, learning style models and how one should address these in the RMME and OTE courses will be discussed. Students differ widely in their preferred learning environments and styles of learning. There may be advantages for some students in presenting material via programs that match their preferred learning style. Section 2.3 discusses several ways of presenting material by discussing teaching methods and what the best teaching methods to use in the RMME and OTE courses are, according to adult learning.

2.1 Main adult learning theories

The students who were doing the RMME and OTE course are adults. Education offered to adults should be different from education offered to children or adolescents, because adults have special needs and requirements as learners. The University of South Australia, unit SEEC should adjust their education to adults. Therefore the main adult learning theories will be discussed in this chapter.

By the years gone, a lot of authors have discussed adult learning. So, there are several adult learning theories. In this chapter, three main adult learning theories will be discussed: Malcolm Knowles' theory of Andragogy, Carl Rogers' Experiential Learning and Patricia Cross' Characteristics of Adults as Learners model. These theories have a different nature. Knowles' theory of Andragogy explains more how adults learn, but does not explain a lot about how the learning material should look like or what kinds of learning material addresses adult learners. The other two theories take that more into consideration. Rogers' experiential

learning focuses on describing the adult development process and the learning challenges it poses (Kolb, 1984). Cross' Characteristics of Adult as Learners model focuses on the development of lifelong learning for adults. Based on these three theories, a list of adult learning characteristics is made, on which the focus will be in the rest of this research project.

2.1.1 Andragogy

As Kearsly (1994-2005) indicated, Knowles' theory of andragogy is an attempt to develop a theory specifically for adult learning. Knowles emphasizes that adults are self-directed and want to take responsibility for decisions. Adult learning programs must accommodate this fundamental aspect. According to Kearsly (1994-2005), andragogy makes the following assumptions about the design of learning: (1) adults need to know why they need to learn something, (2) adults need to learn experientially, (3) adults approach learning as problem-solving, and (4) adults learn best when the topic is of immediate value.

Principles of Andragogy

According to Fogarty and Pete (2004), Knowles believes that andragogy is process-oriented rather than content-based (pedagogy). Fogarty and Pete (2004) have their own ideas about adult learning, but some of their work refers to Knowles' theory of Andragogy. Some of their principles are the same as Knowles' principles. Zemke and Zemke (1995) used the same principles for adult learning as Knowles did. The other sources used in this section, made a reference to the work of Knowles in their own work.

The andragogy theory is anchored on the five following principles:

1. Self concept: As Fogarty and Pete (2004), DeSimone, Werner and Harris (2002) and Kearsly (1994-2005) indicated, and Knowles (1980) mentioned, adult learners are directing their own plan. So, they are in control of their own learning process. Although adult learners, naturally, have varying degrees of self-efficacy, for the most part they demonstrate a strong sense of self in their learning. Even so, some feel embarrassed about returning to school or joining classes of younger students. Some may hold negative impressions of their own abilities, or they may hold negative impressions of schools, teachers, and educational experiences in general. They may have varying level of awareness about their own learning styles. Yet, the adult learner's sense of self greatly influences their learning experiences (Dirkx, Lavin & Pelavin, 1995, In Fogarty & Pete, 2004).

2. Experience: The adult learner has collected a personal growing reservoir of experiences (Fogarty & Pete, 2004; DeSimone et al., 2002; Knowles, 1980). As Dirkx et al. (1995, In Fogarty & Pete, 2004) and Kearsly (1994-2005) indicated, adult learners are diverse learners; they bring a wealth of life experiences to their learning activity and they vary widely in age, abilities, level of schooling, job experiences, cultural background, and personal goals.

3. Readiness to learn: The adult learner is oriented to developmental tasks of social role (Kearsly, 1994-2005; Knowles, 1980). As Fogarty and Pete (2004) and DeSimone et al. (2002) indicated, adults' readiness to learn is anchored to developmental tasks that are necessary for their social roles at home, at work or in their community. Adults are focused on learning skills, concepts, and attitudes that are obviously and directly related to their work, their families, or themselves. They want to learn those things that make their lives easier or better in some substantive way. According to Dirkx et al. (1995, In Fogarty & Pete, 2004) they are seeking to improve their performance, yet schoolwork comes last, after other (work) responsibilities.

4. *Orientation to learning*: The adult learner is problem-centred and aware of the immediacy of application (Fogarty & Pete, 2004; DeSimone et al., 2002; Knowles, 1980). Adult learners want to relate their learning to specific contexts in their lives, ones that usually involve work, their homes and families. Dirx et al. (1995, In Fogarty & Pete, 2004) add to that, that because adults are busy people, they expect that their course will help them with existing problem areas.

5. *Motivation*: According to Knowles (1980) adult learners harbour internal motivation. Adult learners are learning for a reason, and they push themselves from within (Fogarty & Pete, 2004). Zemke and Zemke (1995) add to that, that there are three elements one should take into account when motivating adults: (1) as said, they have a preference for real-world, problem-based approaches, so this should be available; (2) they are more motivated when they have the opportunity for personal growth or gain; and (3) they are more motivated when they can participate.

2.1.2 Experiential learning

The second theory discussed in this chapter is Carl Rogers' Experiential learning. Rogers distinguishes two types of learning: cognitive (meaningless) and experiential (significant). The difference between them is that experiential learning addresses the needs and wants of the learner where cognitive learning does not do that. As Kearsly (1994-2005) indicated, Rogers lists the following qualities of experiential learning: personal involvement, self-initiated, evaluated by learner, and pervasive effects on learner.

According to Rogers, learning is facilitated when: (1) the student participates completely in the learning process and has control over its nature and direction, (2) it is primarily based upon direct confrontation with practical, social, personal or research problems, and (3) self-evaluation is the principal method of assessing progress or success. Kearsly (1994-2005) indicated that Rogers also emphasizes the importance of learning to learn and an openness to change.

Kearsly (1994-2005) mentions that, to Rogers, experiential learning is equal to personal change and growth. Rogers feels that all human beings have a natural tendency to learn; the role of the teacher is to facilitate such learning. This includes: (1) setting a positive climate for learning, (2) clarifying the purposes of the learner(s), (3) organizing and making available learning resources, (4) balancing intellectual and emotional components of learning, and (5) sharing feelings and thoughts with learners but not dominating (Kearsly, 1994-2005). The teacher and the learner engage in a process which is concerned with facilitating an active process of learning in the student. The student becomes responsible for his or her own learning. Hobbs (1992) says that the teacher is a resource and a provider of structure, but learning is seen as taking place when the learner is trying actively to incorporate external knowledge into his or her own internal frame of reference.

Principles of Experiential Learning

Experiential learning is based on four principles:

1. *Relevancy*: According to Hobbs (1992) and Rogers (as Kearsly, 1994-2005 indicated), significant learning takes place when the subject matter is relevant to the personal interests of the student: what is being learned and how it is being learned hold a special importance for that person.
2. *Learning which is threatening to the self*. These could be, as indicated by Kearsly (1994-2005), new attitudes or perspectives. They are more easily assimilated when external threats are at a minimum (Kearsly, 1994-2005). Learning proceeds faster when the threat to the self is low.

3. *Self-initiated learning.* Self-initiated learning is the most lasting and pervasive (Kearsly, 1994-2005). There is an involvement of the whole self – body, thoughts, feelings, and actions, not just the mind (Hobbs, 1992); in other words, the learner is engaged as a whole person.
4. *Participation and experience.* As Kearsly (1004-2005) indicated, experiential learning is concerned with the experience of individuals, not just with their participation. The students are asked to consider and utilise their own experience as a basis for self-understanding and assessment of their own needs, resources and objectives (Hobbs, 1992). The learner is involved in a reflective experience which enables the person to relate current learning to past, present and future, even if these time relationships are felt rather than thought (Hobbs, 1992).

2.1.3 Characteristics of Adults as Learners model

The third theory discussed in this chapter is Cross' Characteristics of Adults as Learners (CAL) model. Cross (1981) presents the CAL model in the context of her analysis of lifelong learning programs. The model attempts to integrate other theoretical frameworks for adult learning such as Knowles' Andragogy, Rogers' Experiential Learning, and Lifespan Psychology.

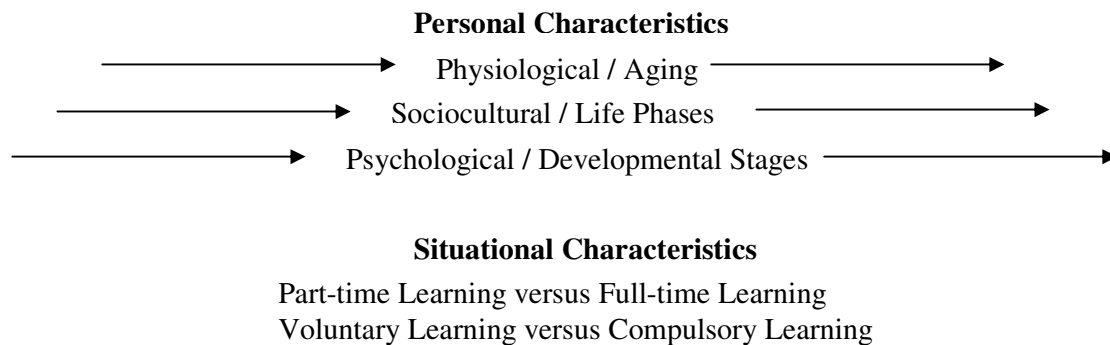


Figure 3. CAL model

As Kearsly (1994-2005) indicated, the CAL model consists of two classes of variables: (1) personal characteristics and (2) situational characteristics. Personal characteristics include: physiological/aging, socio-cultural/life phases, and psychological/developmental stages. These three dimensions have different characteristics as far as lifelong learning is concerned. Aging results in the declining of certain sensory-motor abilities (for example eyesight, hearing, reaction time) while intelligence abilities (for example decision-making skills, reasoning, vocabulary) tend to improve. Life phases and developmental stages (for example marriage, job changes, retirement) involve a series of plateaus and transitions which may or may not be directly related to age (Kearsly, 1994-2005; Cross, 1981).

As Kearsly (1994-2005) indicated, situational characteristics consist of part-time versus full-time learning, and voluntary versus compulsory learning. The administration of learning (for example schedules, locations, procedures) is strongly affected by the first variable part-time versus full-time learning. This means for example that it is more difficult for part-time learners to make a schedule for learning and to find a good, suitable location. The second variable, voluntary versus compulsory learning, belongs to the self-directed, problem-centred nature of most adult learning (Kearsly, 1994-2005).

Principles of Adult Learning Theory

The Adult Learning Theory is based on 4 principles (Kearsly, 1994-2005; Cross, 1981):

1. *Experience*. Adult learning programs should capitalize on the experience of participants.
2. *Limitations*. Adult learning programs should adapt to the aging limitations of the participants.
3. *Personal development*. Adults should be challenged to move to increasingly advanced stages of personal development.
4. *Choice*. Adults should have as much choice as possible in the availability and organization of learning programs.

2.1.4 Combination of theories: characteristics of adult learners

Based on Knowles' chart of nine findings as the prominent issues and concerns of the adult learner (Knowles, 1973, In Fogarty & Pete, 2004) and the above adult learning theories, one could say that adult learners have the following characteristics:

9. Control of their learning
10. Immediate utility
11. Focus on issues that concern them
12. Test their learning as they go
13. Expect performance improvement
14. Maximise available resources
15. Require collaborative, respectful, mutual and informal climate
16. Rely on information that is appropriate and developmentally paced

Each characteristic will be explained and after each explanation a focus of this research will be given.

1. Control of their learning. Buford and Lindner (2002, In Richards, Dooley & Lindner, 2004) are saying that adult learners want control; they want to decide what, where, and how they will learn whatever it is they have targeted for themselves (Caffarella, 2002). According to Fogarty and Pete (2004) they frequently want to continue the formal lesson on their own, through research either online or through sources such as books or journals.

In this research project it was analysed if the adult learning characteristic 'control of their learning' was used in the RMME and OTE course. The students want to have control over the material. They want to access it anytime, anywhere. When they need support of the lecturer in their learning process, they should get this. Students have a goal for doing this course and they have expectations of the course. These goals and expectations play a role in the way they want to control their learning. If one of the goals was that they found it very important to pass for this course, lecturers could use this in the teaching materials.

Therefore, the following evaluation criteria of this research project could be determined when analysing the RMME and OTE course of the LMEF Masters program:

- Students should have *access to all materials* without technical support.
- The *lecturer* should provide suitable *support* to the students.
- The course should meet the *expectations of the students*.
- The course should be *important for the students to pass for*.
- The course should help the students to reach their *goal for doing the course*.

2. Immediate utility. Adult learners are clearly pragmatic learners. They want to know about the immediacy of the utility, they want to use the learning, and they want to use it now. Because time is a priority for adult learners, they want to know that the time spent in a course is well spent. They want a well-organized, high-level activity that speaks to their

immediate, perceived or 'recognized' need (Fogarty & Pete, 2004). They want something that helps them do their job or do their job better.

In this research project it was analysed if the adult learning characteristic 'immediate utility' was used in the RMME and OTE course. The lecturer should be well prepared, and make sure that the lectures contain topics and examples that can be used immediately by the students. The workload of the course should not be too high, and not too low. Therefore, the following evaluation criteria of this research project could be determined when analysing the RMME and OTE course of the LMEF Masters program:

- The *workload* for the course is reasonable. Yes/No
- The *lecturer is prepared*. Yes/No
- The *lectures* should be organized and of meaning for the students.

3. Focus on issues that concern them. Adult learners are focused learners with specific goals in mind that relate to their specific situations. They question the relevance first and the application second (Buford & Lindner, 2002, In Richards et al., 2004). The adult learner is making personal connections to the information and is focusing on related issues of concern. These adult learners are making meaning through their personally relevant examples, and they expect the expert to explicitly connect with their concerns.

In this research project it was analysed if the adult learning characteristic 'Focus on issues that concern them' was used in the RMME and OTE course. The LMEF Masters program and the aims and objectives of the course should be clear to all (future) students. This way they know if the program and the courses are relevant for them, if they fit with their interests. All the material used in the course, should fit with these interests; it should be relevant for them. Even the examples, used in classroom sessions or in instruction, should be relevant.

Therefore, the following evaluation criteria of this research project could be determined when analysing the RMME and OTE course of the LMEF Masters program:

- The LMEF *program* is well *advertised*. Yes/No
- The *aims and objectives* of the course should be clear to the students.
- The *material* should have *relevance* to the students.
- It should be possible for the students to *combine their work with studying*.
- The course should be *relevant to the work* of the students.
- The *examples* used in the course should be relevant and fit with the knowledge the students already have.

4. Test their learning as they go. Adult learners want to know how they are doing as they proceed through the learning experience. They want to keep their eye on the little steps, the various phases on their way to the final accomplishment. Adults want to leave the learning activity knowing how to do it on their own. Adult learners want periodic feedback, just to know how it is going.

In this research project it was analysed if the adult learning characteristic 'test their learning as they go' was used in the RMME and OTE course. Therefore, the following evaluation criterion of this research project can be determined when analysing the RMME and OTE course of the LMEF Masters program:

- The students should receive timely and personalized *feedback* from the lecturer.

5. Expect performance improvement. Adult learners expect to see their performance improved as a result of their classes or lessons. Adults bring varying levels of skill and expertise to the learning, and they are continually self-appraising as they learn.

In this research project it was analysed if the adult learning characteristic 'expect performance improvement' was used in the RMME and OTE course. Because adults have varying levels of

skills and expertise, the course should offer the material in such a way that every students can enhance his/her understanding of the subject. Every student has to learn something. That is why it is important to make sure that every student has the right pre-requisite knowledge, so at least every student has the same beginning level. The material should have an appropriate level that fits with the required knowledge for the course.

The following evaluation criteria of this research project could be determined when analysing the RMME and OTE course of the LMEF Masters program:

- The course should improve the students' *understanding of the subjects* discussed in the course.
- The *material* should have an appropriate *level* that fits with the *pre-requisite knowledge* students already have.

6. Maximise available resources. Adult learners bring a lot of experience and resources to the learning environment. These should be used to maximise available resources. Fogarty and Pete (2004) are saying that adult learners want to know that the adult teaching them knows more than they themselves know about the topic. They want a certain level of expertise.

In this research project it was analysed if the adult learning characteristic 'maximise available resources.' was used in the RMME and OTE course. To use the experience of the individual students, there should be several ways to interact with each other. Students should also have possibilities to interact with the lecturer. The lecturers should make sure that he is knowledgeable about the topics discussed in the course, to make sure that the adult students respect him.

Therefore, the following evaluation criteria of this research project could be determined when analysing the RMME and OTE course of the LMEF Masters program:

- The course provides *interaction facilities*. Yes/No
- The course provides possibilities to have *interaction with a group*. Yes/No
- The *lecturer is knowledgeable* about the topics discussed in the course. Yes/No

7. Require collaborative, respectful, mutual, and informal climate. Adult learners want to collaborate and share. Adult learners seek social settings and are stimulated through discussion and articulation of ideas. Often, they enter into a learning setting in pairs or as a team. When adult learners collaborate, their confidence is boosted and their commitment to using new information is stronger (Fogarty & Pete, 2004).

In this research project it was analysed if the adult learning characteristic 'require collaborative, respectful, mutual, and informal climate' was used in the RMME and OTE course. To get this climate, students do not want to spend their time on application and enrolment, or other administrative problems. If they have an administrative problem, appropriate support should be available, so students can spend their time on their learning process. The facilities used in the course can contribute to an attractive learning climate as well. The lecturer plays an important role in creating a good climate. If he is enthusiastic, students will be stimulated and motivated more by him. The lecturer should make the students feel comfortable with learning by looking at the students' personal background and use these backgrounds in the learning environment.

Therefore, the following evaluation criteria of this research project could be determined when analysing the RMME and OTE course of the LMEF Masters program:

- The *application and enrolment* for the course is easy and not time-consuming. Yes/No
- The students know who to turn to for *administrative support*. Yes/No
- The *facilities* used in the course contribute to an attractive learning climate. Yes/No
- The *lecturer is enthusiastic* about his course. Yes/No

- The lecturer should be able to *motivate* the students.
 - The lecturer should make the students feel *comfortable with learning*.
 - The lecturer should use the *students' personal background* in the learning environment.
8. Rely on information that is appropriate and developmentally paced. Adult learners want the learning paced developmentally, without great gaps or giant leaps to remotely connected information or information that goes beyond their comfort zones (Fogarty & Pete, 2004). Adult learners are curious about theories or research that support a given idea. According to Fogarty & Pete (2004) they do not desire voluminous supporting research, but they do want some evidence of expert support that gives them understanding of the 'why' behind the practice.

In this research project it was analysed if the adult learning characteristic 'rely on information that is appropriate and developmentally paced' was used in the RMME and OTE course. Assignments should be clear, and it should be clear what is expected from the students while making the assignments. This is very important to especially students who have to rely mostly on the written material. The content should be presented in steps and fit with the level of experience and knowledge that the students have, to make sure that the learning process will be optimal.

Therefore, the following evaluation criteria of this research project could be determined when analysing the RMME and OTE course of the LMEF Masters program:

- *Assignments* are clear and univocal. Yes/No
- The *assessment requirements* should be clear to all students.
- The *content* are presented in steps and fit with the level of experience and knowledge that the students have. Yes/No

The eight provided characteristics of adult learners should be taken into account. During this research project there was analysed how these characteristics were used at that moment, but also how they could be improved. This was done by using the evaluation criteria.

2.2 Learning styles

In the previous section (chapter 2.1) the characteristics of the adult students were discussed. When one is taking these specific adult learning characteristics into account, then one should also take into account teaching styles and attempts to make the best match possible between what the lecturer can offer and what the individual adult student needs (Dunn & Dunn, 1979, In McInerney & McInerney, 2002). When there is a match between the learning style needs of the student and what the lecturer provides in his course, learning will be enhanced.

This sub-section will explain the concept of a learning style. To analyse the way the two courses RMME and OTE use different learning styles, David Kolb's Learning Style model will be used. This model will be explained and finally it will be showed how different learning styles can be addressed in one course.

2.2.2 Concept of learning style

As the research on learning styles shows (Kolb, 1984; Gardner, 1993; Sanchez and Gunawardena, 1998, In Hanna, Glowacki-Dudka & Conceição-Runlee, 2000), people learn in multiple ways and through multiple senses.

Litzinger and Osif (1993, In Palloff & Pratt, 2003) define learning styles as the ways in which children and adults think and learn. Learning styles are sometimes described as the personally

constructed filters people use to orient their relationships with the world (O'Connor, 1997, In Palloff & Pratt, 2003). These filters are influenced by factors such as age, maturity, and experience (Palloff & Pratt, 2003), but also by the following factors (Willing, 1988):

- The individual's natural psychological and cognitive being
- Particular education and socio-cultural background
- Schooling in general
- The person's perceptions of his/her own weak points, as well as strengths

Because of various factors contributing to a learning style, some aspects of a given individual's style may change over time, while others may not (Willing, 1988; Palloff & Pratt, 2003).

Research shows that an effort to accommodate learning styles by choosing suitable teaching styles, methodologies and course organization can result in improved learner satisfaction and attainment (Willing, 1988; Brennan, McFadden & Law, 2001). 'The key principle is that in order for students to benefit maximally from instruction and assessment, at least some of each should match their styles of thinking. Different methods of instruction work best for different styles of thought' (Sternberg 1997, p. 115, In Brennan et al., 2001).

2.2.2 Learning style models

After knowing what a learning style is, it is important to use a model for analysing the use of learning styles in the courses. This model will give support. The study of learning styles has provided several categories or groupings of filters. For example, filters may be categorized by the sense – auditory, visual, or kinaesthetic. Some people may respond to auditory information more readily than information presented visually, for example. Other studies of learning styles have focussed on a combination sensory and cognitive approach to examine how students process information (Palloff & Pratt, 2003). In this research project David Kolb's Learning Style model will be used, because this model fits with the characteristics of adult learning, like testing their learning as they go and immediate utility. Adult learners tend to be goal-oriented and experience-based. Adults often see learning as obtaining as much knowledge as possible that can be used in practice or for career advancement. The more directly an adult can employ the material being studied, the more likely he or she will keep hold of the knowledge. Consequently, according to Schroeder (1993, In Palloff & Pratt, 2003), beginning with concrete learning experiences and then building toward abstract understanding is an appropriate strategy that engages the learning styles of adult learners. These are key-words of Kolb's Learning style Model. They will be discussed below. The model also gave rise to related terms such as experiential learning. This is an important adult learning theory, explained in sub-section 2.1.2.

Kolb's Learning Style Model

Kolb's learning theory sets out four distinct learning styles (or preferences), which are based on a four-stage learning cycle. Kolb's model (figure 2) offers a way to understand individual people's different learning styles, and also an explanation of a cycle of experiential learning that can be applied to everybody (Chapman, 1995-2005). The 'cycle of learning' is expressed as a four-stage cycle of learning. These four stages are dependant on each other and can be described in terms of the skills which belong to those stages (Kolb, 1985; Chapman, 1995-2005; Thesis, n.d.; Blackmore, 1996):

1. Concrete experience (Feeling) - (CE): being involved in a new experience
2. Reflective observation (Watching) - (RO): watching others or developing observations about own experience

3. Abstract conceptualization (Thinking) - (AC): creating theories to explain observations
4. Active experimentation (Doing) - (AE): using theories to solve problems, make decisions

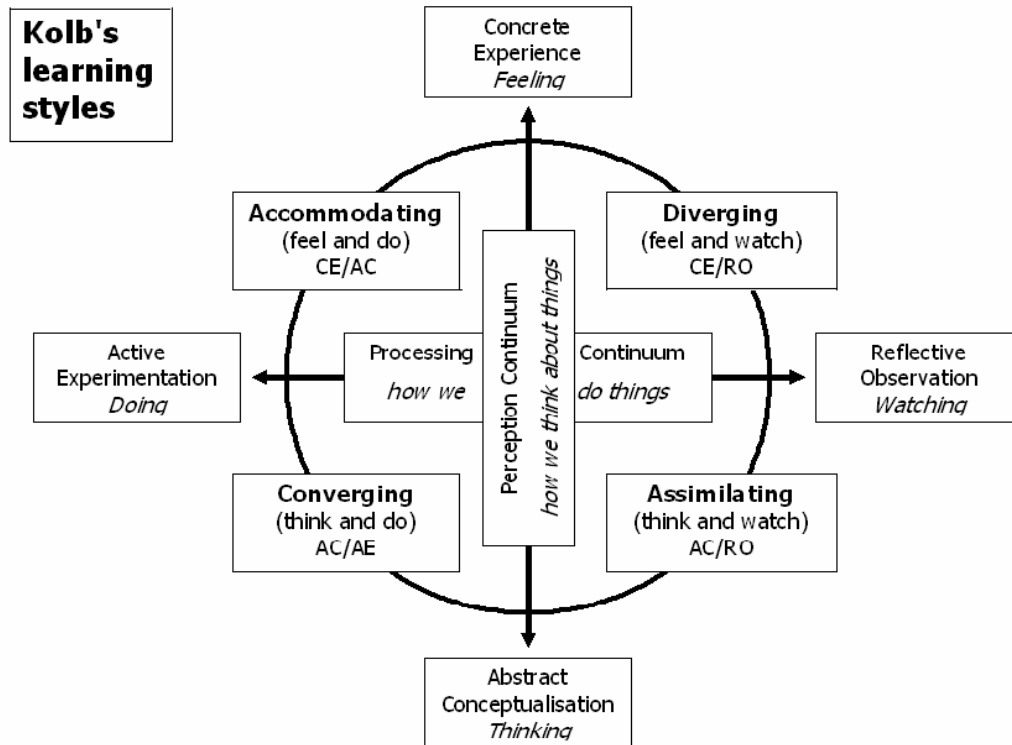


Figure 4. Kolb's learning style model
(Figure from Chapman, 1995-2005)

Kolb says that ideally this process represents a learning cycle or spiral where the learner 'touches all the bases' (Kolb, 1985; Chapman, 1995-2005). When you experience something this leads to observations and reflections. These reflections are then assimilated (absorbed and translated) into abstract concepts. The person can actively test and experiment with these, which in turn enables the creation of new experiences (Kolb, 1985; Chapman, 1995-2005; Thesis, n.d.). It is possible to go through the stages in a different order, or to skip a stage. But when a stage is skipped or too rapidly passed through the learning outcomes decrease (Thesis, n.d.)

In the previous it was said that Kolb's model works on a four stage cycle, but it can also work on an other level: a four-type definition of learning styles, each representing the combination of two preferred styles, for which Kolb used the terms (Kolb, 1985; Chapman, 1995-2005; Thesis, n.d.; Blackmore, 1996; 'Learning style inventory based on David Kolb's model', n.d.):

1. Diverging (CE/RO)
2. Assimilating (AC/RO)
3. Converging (AC/AE)
4. Accommodating (CE/AE)

1. Diverging (feeling and watching – Concrete experience/Reflective observer)

The people with a diverging learning style are able to look at things from different

perspectives (Chapman, 1995-2005; 'Learning style inventory based on David Kolb's model', n.d.) and generate many ideas such as in a 'brainstorming' session ('Learning style inventory based on David Kolb's model', n.d.). They are motivated to discover the relevancy or "why" of a situation. They like to reason from concrete specific information and to explore what a system has to offer and they prefer to have information presented to them in a detailed, systematic, reasoned manner (Kolb, 1985; Blackmore, 1996). They learn best when they get time to think things through and when they can make decisions without time limits (Kolb, 1985; Chapman, 1995-2005; Thesis, n.d.). Ready reference guides provide handy, organized summaries for this kind of learner (Blackmore, 1996). Divergers are interested in people and tend to be imaginative and emotional ('Learning style inventory based on David Kolb's model', n.d.).

2. Assimilating (watching and thinking - Abstract conceptualization/Reflective observer)

The assimilating learners are motivated to answer the question, "What is there to know?" (Blackmore, 1996). They like accurate, organized delivery of information (Kolb, 1985; Blackmore, 1996; Thesis, n.d.) and they tend to respect the knowledge of the expert (Blackmore, 1996). They are not that comfortable randomly exploring a system and they like to get the 'right' answer to the problem (Kolb, 1985; Blackmore, 1996; Chapman, 1995-2005; 'Learning style inventory based on David Kolb's model', n.d.). These learners are perhaps less 'instructor intensive' than some other learning styles. They will carefully follow prepared exercises, provided a resource person is clearly available and able to answer questions (Kolb, 1985; Blackmore, 1996; Thesis, n.d.). They are more interested in theoretical concepts, models and systems (Chapman, 1995-2005; Thesis, n.d.; 'Learning style inventory based on David Kolb's model', n.d.). They learn best when they get enough time to think things through and see where there are relations between the concepts (Chapman, 1995-2005; Thesis, n.d.).

3. Converging (Abstract conceptualization/Active experimenter)

Learners with the converging learning style are motivated to discover the relevancy or "how" of a situation. Application and usefulness of information is increased by understanding detailed information about the system's operation (Kolb, 1985; Blackmore, 1996). The people with the converging learning style learn best from activities in which they can focus on the practical application of ideas (Kolb, 1985; Chapman, 1995-2005; Thesis, n.d.; 'Learning style inventory based on David Kolb's model', n.d.). They prefer technical tasks, and are relatively unemotional. They prefer to deal with technical things, rather than people (Chapman, 1995-2005; 'Learning style inventory based on David Kolb's model', n.d.).

4. Accommodating (doing and thinking - Concrete experience/Active experimenter)

The accommodating learning style is 'hands-on', and relies more on intuition than on logic (Kolb, 1985; Chapman, 1995-2005; Thesis, n.d.). These people are motivated by the question, "what would happen if I did this?" They look for significance in the learning experience and consider what they can do, as well as what others have done previously. These learners are good with complexity and are able to see relationships among aspects of a system (Kolb, 1985; Blackmore, 1996; 'Learning style inventory based on David Kolb's model', n.d.). They learn best from new experiences and problem solving (Thesis, n.d.; 'Learning style inventory based on David Kolb's model', n.d.).

Whatever influences the choice of style, the learning style preference itself is actually the product of two pairs of variables, or two separate 'choices' that we make, which Kolb

presented as lines of axis, each with 'conflicting' modes at either end (Kolb, 1985; Chapman, 1995-2005):

Concrete Experience - CE (feeling) -----**V**---- **Abstract Conceptualization - AC** (thinking)
Active Experimentation - AE (doing) ----**V**---- **Reflective Observation - RO** (watching)

A typical presentation of Kolb's two continuums is that the east-west axis is called the Processing Continuum (how we approach a task), and the north-south axis is called the Perception Continuum (our emotional response, or how we think or feel about it) (Kolb, 1985; Chapman, 1995-2005; Blackmore, 1996). People cannot do both at the same time, and to an extent our urge to want to do both creates conflict, which we resolve through choice when confronted with a new learning situation. We internally decide whether we wish to do or watch, and at the same time we decide whether to think or feel (Chapman, 1995-2005; Blackmore, 1996). Usually people come to prefer, and rely on, one preference above the others. And it is these main preferences that instructors need to be aware of when creating instructional materials (Blackmore, 1996).

2.2.2 Addressing different learning styles in a course

According to Palloff and Pratt (2003), Moran (1997), Brennan et al. (2001) and Hanna et al. (2000) it is not necessary to create several presentations of the same material for students with different learning styles. Instead, if an instructor uses multiple approaches to the material being presented, along with various types of assignments, all stages of Kolb's learning styles model and so the learning styles of all students will be engaged in the learning process (Moran, 1997; Palloff & Pratt, 2003).

Instead of viewing learning styles as narrow, restrictive means through which particular students learn, Palloff and Pratt (2003) say it is helpful to see them as a specific preference among a number of preferences. The preferred style is how one student is likely to approach the material being studied, but he or she also has access to other styles. They may be somewhat weaker because they are not used as often. These styles can, however, be tapped and developed (Moran, 1997; Palloff & Pratt, 2003).

Students learn best when they approach knowledge in ways they trust. However, an instructor can also design activities that challenge students to develop their skills in another learning preference (O'Connor, 1997, In Palloff & Pratt, 2003). Moran (1997) adds to this that assessing adult learning is not only a matter of matching the learner's preferred style, but also to challenge the learners to move to higher levels.

Claxton and Murrell (1988, In Palloff & Pratt, 2003) note that instructors may choose to match or mismatch activities in a course to a student's learning style, depending on the purpose and goals of the course. O'Connor (1997, In Palloff & Pratt, 2003) notes that technology actually increases the range of activities that an instructor can use to address varying learning styles. He looks specifically at activities in three general categories: (1) adding alternatives, (2) learning cycles, and (3) complex activities.

When adding alternatives, an instructor makes options available to students for the completion of assignments. Learning cycles involve designing systematic sets of activities that facilitate all learning styles before completing an assignment. Various units in an online course can be developed with learning cycles in mind. Simulations, for example, give students an opportunity to develop and demonstrate skills, especially when they carry them out in teams. An actual case is presented to the team with a series of increasingly difficult tasks to complete. With the completion of each task, a learning cycle is completed. Another strategy might be to have students submit drafts of assignments as the term progresses or demonstrate

the completion of a piece of a project. Complex activities demand that students approach a topic through the use of multiple skills. The instructor provides broad guidelines for completion of the project and then students organize and complete the project based on their styles and needs. The completion of a collaborative, comprehensive group paper or project is a good example of the inclusion of complex activity into a course (Palloff & Pratt, 2003). Regardless of which approach or theoretical framework an instructor takes in the issue of learning style, the key is to recognize that differences exist and must be accounted for somehow in an (online) class (Palloff & Pratt, 2003; Moran, 1997). A 'one size fits all' approach will not work. It is a mistake to assume that every (online) student looks and feels the same. That is why in this research project, it will be analysed if at least every learning style mentioned by Kolb is addressed in at least one way, in each evaluated course. In the next section, several teaching methods to address each learning styles will be shown.

2.3 Teaching methods

This section will show how Kolb's learning style model can be used in teaching methods. Because the RMME and OTE course had a mix of both face-to-face and online learning, a variety of teaching methods could be used. That is why more general teaching methods that fit with adult learning styles will be explained. This way it is made clear what teaching methods to use in the RMME and OTE courses of the LMEF Masters program.

2.2.2 Teaching methods that fit with Kolb's Learning Style model

The different learning styles mentioned in section 2.2.2 that belong to Kolb's learning style model are at one level the following stages: concrete experience, reflective observation, abstract conceptualization and active experimentation. On the other level there were four stages of learning styles: diverging, assimilating, converging and accommodating. Hartman (1995, In Blackmore, 1996) took Kolb's learning styles and gave examples of how one might teach to each of them. Together with the teaching methods mentioned by Palloff and Pratt (2003) this leads to the following outline that can be used when looking at the teaching methods used in the RMME and OTE course:

1. For the concrete experienter: offer (virtual) laboratories, field work, simulations, observations, presentation and discussion of projects, or show movies.
2. For the reflective observer: use logs, journals or brainstorming.
3. For the abstract conceptualizer: visual aids such as PowerPoint or whiteboard, lectures, papers, textbooks and analogies work well.
4. For the active experimenter: offer simulations, case studies, problem-solving activities, abstract concepts and the use of (virtual) laboratories.

Instructional methods that suit divergers include lecture methods that focus on specifics such as the strengths, weaknesses and uses of a system, and some hands-on exploration of a system (Hartman, 1995, In Blackmore, 1996). This can be case studies, problem-solving activities and (virtual) laboratories. Diverging people are interested in other people ('Learning style inventory based on David Kolb's model', n.d.) and like to think things through (Kolb, 1985). Because of that, participation in collaborative and group activities, and activities requiring self- and group assessment are good teaching methods for Divergers (Palloff & Pratt, 2003).

Instructional methods that suit assimilators include lecture methods (video/audio presentation for instance in a PowerPoint presentation), followed by a demonstration, an exploration of a subject in for example a case study, following a prepared tutorial (which they will probably

stick to quite closely). For these tutorials some answers should be provided (Hartman, 1995, In Blackmore, 1996). Assimilators can also learn a lot from other visual aids than PowerPoint, like maps, diagrams, and graphics. They like to use Internet resources, particularly those that contain graphics (Palloff & Pratt, 2003). For online assimilating students videoconferencing can be a good instructional technique.

According to Hartman (1995, In Blackmore, 1996) instructional methods that suit people with the converging learning style include an interactive, not passive instruction, possibly some computer-assisted instruction and some problem sets or workbooks that students can explore. Also simulations, (virtual) laboratories, fieldwork, giving presentations and holding discussions of projects is helping them with learning (Palloff & Pratt, 2003). They like to work more with technical aspects than with people (Chapman, 1995-2005; 'Learning style inventory based on David Kolb's model', n.d.). So they do not really like group-work.

A variety of methods are suitable for the accommodating learning style, but it is best to use anything that encourages independent discovery (Hartman, 1995, In Blackmore, 1996). Accommodators prefer to be active participants in their learning, so it is also best to use a teaching method in which they can be active (Blackmore, 1996) like simulations, case studies, problem-solving activities, giving presentations and holding discussions of projects and fieldwork (Palloff & Pratt, 2003).

2.2.2 Teaching methods to address adult learning styles

Besides the teaching methods mentioned to each specific Kolb learning style in the previous section, a lot of other teaching methods to address adult learning styles can be used. The recognition of the different styles of learning implies that there is a need to take advantage of the multiple instructional strategies that are available in the two courses. Because the RMME and OTE course had a mix of both face-to-face and online learning, it was also important to look at online teaching methods like a bulletin board, e-mail and online lectures. Differences in learning styles need to be accepted and accommodated in every part of the (online) delivery of the education of the RMME and OTE courses of the LMEF Masters program.

Paulsen (1995, In Palloff & Pratt, 2003) suggested that incorporating activities that are one-alone (activities that are structured for minimal interaction with others), one-to-one (activities that are done in pairs or through e-mail), one-to-many (the use of bulletin boards, where material can be accessed), or many-to-many (the use of computer conferencing techniques) can successfully address all learning styles of the online student.

- *One-Along activities.* Doing Internet research, including using online databases and journals, receiving information via e-mail from (online) groups producing information related to course material, and applying prior knowledge or learning are a few such activities.
- *One-to-one activities.* These include doing independent studies, taking correspondence courses, and making learning contracts.
- *One-to-many activities.* These include online lectures, whiteboard sessions, and online symposia using audio or video produced by the lecturer.
- *Many-to-many activities.* These are the most common activities. They include discussion groups, and the discussion board; debates on critical or controversial issues in the course content; simulations; role plays; case studies (cases can be presented by the lecturer for student response or students can be asked to generate cases from their work or lives that they can ask their peers to comment on); and collaborative group projects, which can take the form of small group research projects, discussions of cases, simulations, or role plays.

Brainstorming sessions, where students are given a situation and asked to respond quickly with their ideas, either synchronously or over a period of a day or so on the asynchronous discussion board, are another example (Palloff & Pratt, 2003).

All these teaching methods mentioned here fit with the adult learning characteristics mentioned in sub-section 2.1.4, like having control over their learning, they can use their own experience, focus on issues that concern them, they can test their learning process and they can learn in a collaborative and informal climate.

Including collaborative activity in a course – whether it is through small group projects, simulations, case study work, or other methods – is probably the best way to tap into all learning styles present in the group (Palloff & Pratt, 2003; Turoff, Discenza & Howard, 2004). Students work from their strengths, completing one another and integrating material as they go. In addition, collaboration helps promote the following (Palloff & Pratt, 2003):

- *Development of critical thinking skills.* Collaborative activity does not allow students to assume anything (Turoff et al., 2004). Assumptions must be supported as well as checked out with peers. Working in a small group helps to deepen the thinking process. The weaker students can benefit from the skills of the stronger students and learn a lot from them (Turoff et al., 2004).
- *Co-creation of knowledge and meaning.* Collaborative activity helps students to broaden their thinking on a topic by sharing and working with all viewpoints in the group (Palloff & Pratt, 2003; Turoff et al., 2004). Thus, the students engage in a process through which a new sense of knowledge and meaning about the topic being studied is created (Palloff & Pratt, 2003).
- *Reflection.* Collaborative activity allows students to take their time in discussing and thinking about the project they are working on together (Palloff & Pratt, 2003; Turoff et al., 2004). If the group truly engages in collaborative practice, however, taking time to reflect and process helps the group to produce a more meaningful product.
- *Transformative learning.* By promoting reflection and collaborative activity, students are tapping into some of their weaker learning preferences and develop them. This way a transformation in the way they approach learning will occur (Palloff & Pratt, 2003).

2.4 Conclusion

Based on the three discussed adult learning theories, a list of eight adult learning characteristics was made on which the two courses were going to be evaluated: (1) control of their learning, (2) immediate utility, (3) focus on issues that concern them, (4) test their learning as they go, (5) expect performance improvement, (6) maximise available resources, (7) require collaborative, respectful, mutual and informal climate and (8) rely on information that is appropriate and developmentally paced. Each of these characteristics resulted in evaluation criteria which were used while evaluating the two courses. This chapter also provided four learning styles taken from Kolb's Learning Style Model: diverging, assimilating, converging and accommodating. For each learning style several teaching methods were presented.

When using a teaching method, the eight adult learning characteristics should always be taken into account. So, in short, the experience (including mistakes) of adults should provide the basis for learning activities. Adults are most interested in learning subjects that have immediate utility to their job or personal life, everything they have to do for the course has to have relevance. Learning should be problem-centred rather than content-oriented. Since adults are self-directed, instruction should allow the adult learners to discover things for themselves,

providing guidance and help when mistakes are made (Kearsly 1994-2005). Also learning materials have to be provided in steps and it is important that the students feel comfortable with the teaching methods used in the course. Therefore strategies such as case studies, role playing, simulations, and self-evaluation are useful. Instructors adopt a role of facilitator or resource rather than lecturer or grader (Kearsly, 1994-2005).

In sub-section 2.3.1 and 2.3.2 several teaching methods were mentioned. The teaching methods mentioned to address all Kolb's learning styles and those mentioned who address adult learning styles are supporting each other. There is a big overlap. For example, using self-directed teaching methods to address adult learning styles can be a case-study, or preparing a presentation for fellow students. By giving a presentation to fellow students, the resources available in class or in the work-group are used, because the experiences of the students are shared. Also using a discussion board is a good teaching method in which students can share their knowledge and experiences. These are all teaching methods that fit with the accommodating learning style. Another example is that collaboration and group-activities are teaching methods that fit with the diverging learning style and this is also very important in adult learning and teaching methods to address adult learning styles.

It is not realistic to use all the mentioned teaching methods in the course, but it is advised to use several teaching methods, so that at least each learning style teaching method is present in the course. And as Moran (1997) mentioned, assessing adult learning is not only a matter of matching the learner's preferred style, but also to challenge the learners to move to higher levels.

3 Research design

In the previous chapter the theoretical framework for this research project was determined. There was looked at adult learning characteristics and learning styles, with special attention to Kolb's learning style model. Chapter two resulted in a lot of evaluation criteria for these subjects. On grounds of these evaluation criteria the quality of the two courses will be evaluated and where necessary improved. In the several activities undertaken to determine the quality, these evaluation criteria will be used.

In this research project there were two phases, an evaluation phase and phase which leads towards recommendations. Both phases will help to answer the main question of this project: 'How can the 'Research Methods in a Multidisciplinary Environment' (RMME) and 'Operational Test and Evaluation' (OTE) courses of the LMEF Masters program ensure best teaching practice, so that several adult learning styles are addressed?'

In the evaluation phase several research methods were conducted, including a course exploration, a document analysis, a questionnaire was sent to the students of the two courses and interviews were undertaken with students and lecturers about the education, and the several learning styles of adults used in the education. There was looked how learning styles were used, which of Kolb's learning styles were used and how the two courses could be improved, so that Kolb's learning styles are better represented. There was also looked at the adult learning characteristics found in chapter 2; how were they used and how could they be improved in the courses?

After that, in the towards recommendations-phase a formative evaluation was carried out with the lecturers and students. Conclusions and recommendations, to improve to what extend the RMME and OTE course serve adult learners with several learning styles, were discussed with the lecturers and students, to see what they thought of the suggested improvements. These conclusions and recommendations were based upon the results of the evaluation phase. After that formative evaluation the final conclusions and recommendations were adjusted. Finally, an implementation plan was written based on the conclusions and final recommendations to improve to what extend the RMME and OTE course serve adult learners with several learning styles.

In section 3.1 the first phase, the evaluation phase, will be discussed. In section 3.2 the second phase, the evaluation of the recommendations, will be discussed. In both sections the research questions and the activities will be discussed. Each activity will be explained, the selected respondents will be mentioned and the way of processing and analyzing the retrieved information will be explained.

3.1 Phase 1: Evaluation

The first phase of this research was the evaluation phase. In this evaluation phase an answer to research question 1 was given. This evaluation phase was a formative evaluation of the education offered to the students at this moment. Different activities were undertaken: a course exploration, a document analysis, a questionnaire and interviews with the lecturers and the students.

Formative evaluation

The primary goal of the overall formative evaluation was to improve the quality of the RMME and OTE courses of the LMEF Masters program, by looking at the degree in which the courses could serve adults with several learning styles.

One of the overall goals of this formative evaluation was effectiveness (Tessmer, 2001): will the adult students learn what the university wants them to learn? Is the learning environment offered in such a way that the students could use their own learning styles. Or which recommendations would not help the students with learning?

Another goal was efficiency (Tessmer, 2001): would they learn in a time or cost-effective manner? Did the way the interaction methods in the blended learning environment were delivered fit with the characteristics of the adult students?

Interest and motivation could determine the level of sustained attention (Tessmer, 2001): Will the students want to learn and attend to the learning? When the used interaction methods aligned with the characteristics of the adult students, the learning would be more interesting and attractive. That way the students would be more willing to learn.

A fourth goal is about the usability (Tessmer, 2001): Could the adult students easily use the interaction methods in the blended learning environment? When it would take the adult students too much time to use the interaction methods, they would not use it.

A fifth goal was acceptability (Tessmer, 2001): Would the lecturers or students use the recommendations the way it was intended or would they use it at all?

Formative evaluating occurs during the planning and operation of a program. The purpose of formative evaluations is to provide information that may result in the improvement of the product or program (Worthen & Sanders, 1987; Vockell & Asher, 1995; Tessmer, 2001). A formative evaluation is applied to materials that are being developed (Tessmer, 2001). In this research project, the developed materials are the recommendations about the use of learning styles in adult learning, combined with the recommendations about the use of interaction methods in the blended learning environment that Marieke Klink had written. The overall questions that were asked in the formative evaluation were about the students' and lecturers' expectations related to the following questions: (1) What is working? (2) What needs to be improved? and (3) How can it be improved? (Worthen & Sanders, 1987). The focus in these questions was on improving the degree in which the courses can serve adults with several learning styles.

3.1.1 Research questions 1

In this phase research question 1 was examined:

1. What is the quality of the RMME and OTE courses of the LMEF Masters program by looking at the degree in which the courses can serve adults with several learning styles?
 - a) To what extend do the courses RMME and OTE reckon with the fact that adults learn in different ways?
 - i. To what extend have the adult learning theories and learning style model been integrated in the courses?
 - b) Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?
 - i. What are the best teaching methods to use in the RMME and OTE courses of the LMEF Masters program according to adults?
 - ii. To what extend have these specific teaching methods been integrated in the courses?

- c) Which of the characteristics of adult learning styles are already implemented correct in the RMEE and OTE courses?

3.2.2 Activities

To answer the question above several activities were undertaken. Each activity will be explained, the selected respondents will be mentioned and the way of processing and analyzing the retrieved information will be explained.

One of the most important concepts in qualitative research is triangulation (Slavin, 1992). Different data collection methods provide information from different points of view on the same topic, and thereby provide more reliable data than for example interviews alone. Triangulation was used, when answering research question 1.

To examine research question 1, first the profile of the LMEF Master program had to be determined. Attention had to be paid to what extend the RMME and OTE course take into account that adult learners have several learning styles. To analyse this, the course website had to be analysed, the AITEC questionnaire of the last 2 years and the questionnaire used for the course evaluation of the University of South Australia of the last two years had to be analysed, and lecturers and students of the courses needed to be interviewed. In total there were 2 lecturers and 34 students. Because of the timeframe for this research project it was not possible to interview all the 34 RMME and OTE students. A questionnaire was a good alternative to get as much information as possible.

Also to examine research question 1, one needs to get more information about the use of learning styles and adult learning characteristics in the RMME and OTE course of the LMEF Masters program. To get this information the lecturers and the students of the two courses were interviewed and a questionnaire was sent to all the students.

Course exploration

To analyse to what extend the RMME and OTE course serve adult learners with several learning styles, the course website was analysed. The evaluation criteria mentioned in chapter 2 were used during this analysis. During the analysis of the course website, the focus was on what learning styles were used and which adult learning characteristics were addressed. This way an answer could be given to the questions ‘To what extend do the courses RMME and OTE reckon with the fact that adults learn in different ways?’, ‘To what extend have these specific teaching methods been integrated in the courses?’ and ‘Which of the characteristics of adult learning styles are already implemented correct in the RMEE and OTE courses?’.

Analysis of questionnaires 2003 and 2004

To analyse to what extend the RMME and OTE course take into account that adult learners have several learning styles, the AITEC questionnaire of 2003 and 2004 was analysed. The AITEC questionnaire made use of a 5-point scale: strongly disagree- disagree- undecided- agree-strongly agree.

These evaluations were conducted after completion of the semester in 2003 and 2004. It focused on areas such as course content, delivery mode and lecturing. The course evaluation of the University of South Australia was not analysed, because the course evaluations were not available.

The questionnaire could not be analysed with the statistical software program, Statistical Package for the Social Science (SPSS), because the individual responses were not available, only the conclusions of these individual responses were available. That is why there is chosen

to analyse the conclusion by calculating percentages of the results. These conclusions were used to analyse if there were differences in given answers between the various years and between the two groups face-to-face and online? Was there coherence between the given answers and the various groups? All of this was done to look if there could be found any suggestions for improvements of addressing the various learning styles and adult learning characteristics. This way an answer could be given to the following sub-questions and underlying questions: 'To what extend do the courses RMME and OTE reckon with the fact that adults learn in different ways?', 'To what extend have the adult learning theories and learning style model been integrated in the courses?', 'To what extend have these specific teaching methods been integrated in the courses?' and 'Which of the characteristics of adult learning styles are already implemented correct in the RMEE and OTE courses?'

Interviews

To analyse to what extend the RMME and OTE course serve adult learners with several learning styles, interviews with the lecturers and students were undertaken. The focus was on adult learning characteristics like the goal for doing the course, the relevance of the course, group-work, possibilities to learn from fellow students, if the course fits with the personal work situation and life situation, the workload and if the lecturer is motivating and encouraging the students. There were also questions about the used teaching methods in the course and the preferred learning styles of the students. This way an answer was given to the following sub-questions and the belonging underlying questions: 'To what extend do the courses RMME and OTE reckon with the fact that adults learn in different ways?', 'To what extend have the adult learning theories and learning style model been integrated in the courses?', 'Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?', 'What are the best teaching methods to use in the RMME and OTE courses of the LMEF Masters program according to adults?', 'To what extend have these specific teaching methods been integrated in the courses?' and 'Which of the characteristics of adult learning styles are already implemented correct in the RMEE and OTE courses?'

To ensure that all the questions were answered during the interview and that the interviewer understands the responses supplied by the participant, there was chosen for a structured interview. A structured interview is much like a questionnaire. Specific questions were asked with little room to deviate from the desired responses (Phillips, 1997)

To make sure that the respondent could not influence each other while giving the answers, there was chosen to use individual interviews. The interviewer had the possibility to keep on asking and there was direct contact with the respondent, what cooperation supports. Students as a source also give a very important and unique view, because they are the ones receiving the education (Braskamp, Brandenburg & Ory, 1986).

The interview questions for the *lecturers* can be found in appendix 1 and the interview questions for the students can be found in appendix 2. In total there were interviews with two groups. The first group consisted of the two lecturers of the RMME and OTE course, the second interview-group were the students of the RMME and OTE course.

The RMME and OTE course have their own lecturer who is responsible for the education of that course. The two interviewed lecturers were the only lecturers teaching these courses

There were 20 mostly *part-time students* who were following the RMME course and 14 students who followed the OTE course. The interviewed students followed the program face-to-face in Adelaide as well as out of Adelaide. These students followed the courses online.

The selection was made in such a way that both groups, online and face-to-face students, were represented for each course. In total there were interviews with eight students. From the RMME course three face-to-face and one online student were interviewed. From the OTE course two online and two face-to-face students were interviewed. It was not possible to randomly select the student, because there was a low response rate.

During the interviews, it is possible that the interviewer would like to hear what fits with the research project. Therefore it is possible that he influences the student or the lecturer to say specific conforming things. Also when analysing the results of the interviews, it is possible that the interviewer interpreted answers in a different manner than intended by the student. To make sure all answers were interpreted correct, the researchers did a member check in which the results of the interviews were sent to all students and the lecturers, asking if the answers were interpreted correctly. According to Russell & Gregory (2003) member checking was done to inquire whether participants' viewpoints were realistically interpreted, to determine whether there are errors of fact.

Questionnaire

To analyse to what extend the RMME and OTE course serve adult learners with several learning styles and which way the adult learning styles could be used best for the students of the RMME and OTE courses of the LMEF Masters program, a questionnaire was sent to all the students of the two courses. This way an answer could be given to the following sub-questions and belonging underlying questions: 'To what extend do the courses RMME and OTE reckon with the fact that adults learn in different ways?', 'To what extend have the adult learning theories and learning style model been integrated in the courses?', 'Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?', 'What are the best teaching methods to use in the RMME and OTE courses of the LMEF Masters program according to adults?', 'To what extend have these specific teaching methods been integrated in the courses?' and 'Which of the characteristics of adult learning styles are already implemented correct in the RMEE and OTE courses?'

The aim of a questionnaire is collecting and analyzing information for solving problems (Swanborn, 1994). A questionnaire is a good method to do research about motives, attitudes, opinions and future plans of the students (Swanborn, 1994). Another reason for using a questionnaire is that in a short time one can send a large amount of questionnaires (Swanborn, 1994). So, in a short time one can get a lot of data, this was time saving. Also the received information could be analyzed in a shorter time than by analyzing the information obtained in interviews. There was chosen to use a questionnaire and send it to all of the students, because this way all the students could participate in the research. Some of the students lived in other cities than Adelaide and the students had very busy work schedules. By sending the students an e-mail with the questionnaire attached, they could fill it in whenever they felt like doing it. The send questionnaire can be found in appendix 3. The questionnaire consists of questions relevant for this research project and the questions relevant to the research project of Klink (2006). This was done because of the time limits of the respondents. It was more likely that they fill in one questionnaire instead of two. This way it was expected to get more responses. The two research projects correlated with each other, they were consistent to each other.

All of the students of both the RMME and OTE course received an e-mail. That means there could be in total 34 responses (20 RMME students: 16 face-to-face, 4 online; and 14 OTE

students: 9 face-to-face, 5 online). The students were asked to fill it in and reply the questionnaire as soon as possible.

In total there were 18 responses (10 RMME students: 8 face-to-face and 2 online; and 8 OTE students: 4 face-to-face and 4 online).

The questionnaire was analyzed by using the statistical software program SPSS. SPSS was used to look at the given answers and how many times these answers were given. Special attention was given to the two groups face-to-face and online students. Were there differences in given answers between the two groups face-to-face and online? The students could choose from the answers: strongly disagree, disagree, agree and strongly agree. These answers were given a number: strongly disagree = 1, disagree = 2, agree = 3 and strongly agree = 4. In the questionnaire the students had to put an 'x' in the box of their answer. After that the mean of each question was calculated. All mean responses between 1 – 1.49 meant strongly disagree; 1.50 – 2.49 meant disagree; 2.50 – 3.49 meant agree and 3.50 – 4.00 meant strongly agree. The questionnaire contained also two open questions: major strengths and suggestions for improvements.

Before using the results of the developed questionnaire to answer research question 1, a reliability analysis had to be conducted to make sure that the results of the questionnaire was reliable. After the Cronbach alpha was determined, a pronouncement could be made about the reliability of the questionnaire as a whole. In this research project the questionnaire would be reliable, when a Cronbach alpha of at least .80 was achieved. The Cronbach alpha of the developed questionnaire was .932. One could conclude from this alpha that the developed questionnaire was reliable. A factor analysis was conducted to analyse if some items should be removed for the results, because they had a negative influence on the Cronbach alpha. This was not the case, so all questionnaire items are taken for further analysis. All of this is done to look if there can be found any suggestions for improving to what extend the RMME and OTE course serve adult learners with several learning styles.

Validity

The sample size of the interviews was small. Because each course had one lecturer, the information they gave could not be compared. Also for each course; four students were interviewed. The selected students were not randomly selected, because the response rate was low. Every student volunteering to be interviewed had to be included in the sample. As a result of this there may be a selection bias; causing a low internal validity (Slavin, 1992). The content validity of the developed questionnaire was given special attention, to make sure it was high. The questions asked in the questionnaire were selected carefully, to make sure that each adult learning characteristic and each learning style was present in the questionnaire. This way the chosen questions related to the aim of the developed questionnaire (Slavin, 1992): to get more and additional information about adult learning styles. Also special attention was given to the wording used in the questions, to make sure that respondents all understood the questions in the same way.

3.2 Phase 2: Towards recommendations

The second phase of this research project was the phase which led towards recommendations. In this phase an answer to research question 2 was given. Different activities were undertaken to answer research question 2: conclusions and recommendations

were written and a formative evaluation was undertaken by interviewing the lecturers of the two courses and the students.

3.2.1 Research question 2

In this phase research question 2 was answered:

2. How can the quality of the RMME and OTE courses of the LMEF Masters program be improved, by looking at the degree in which the courses can serve adults with several learning styles?
 - a. Which of the characteristics of adult learning styles can be improved in the RMME and OTE courses?

3.2.2 Activities

To answer the question above different activities were undertaken. Each activity will be explained, the selected respondents will be mentioned and the way of processing and analyzing the retrieved information will be explained.

Writing conclusions and recommendations

To answer research question 2 and the belonging sub-question, conclusion and recommendations had to be written, based upon the results of the evaluation phase. The following reasons were used to decide when a recommendation was adopted:

- The suggested improvements of the AITEC questionnaire 2003 were not taken into consideration in the rest of the research, when the suggested improvements in the AITEC questionnaire were only mentioned in 2003 and did not come back in the questionnaire of 2004, the developed questionnaire or in the interviews with the students and the lecturer. They were not relevant anymore and had most likely been improved in the last two years.
- A recommendation was adopted when according to the different activities undertaken, the education would be improved.
- A recommendation was also adopted when it was very important according to the literature (see chapter 2), even if according to the interviews/developed questionnaire, the lecturer or most students did not like the recommendation. There was analysed how significant a comment of the student or lecturers was.
- Some recommendations were adjusted, based on the results of the formative evaluation of the recommendations. Recommendations were adjusted, when some words had to be added to the recommendation to make it more specific, so textual changes. Recommendations also were adjusted when the idea behind the recommendation was good, but the recommendation was not usable the way it was, because it took too much time for the students or lecturer the way it was suggested.
- The actual evaluation criteria can be read in chapter 2.

In this phase conclusions and recommendations were written to ensure best teaching practice of the RMME and OTE course of the LMEF Masters. Recommendations were given concerning the improvement of the degree in which the courses can serve adults with several learning styles. The written recommendations are combined with the results of the evaluation phase from Klink (2006).

The recommendations covered different topics:

- Interaction
- Interaction (teaching) methods
- Feedback
- Assignments

- General recommendations

Formative evaluation

After drawing conclusions and writing recommendations based upon the results of phase 1, a formative evaluation was undertaken with the lecturers and students to hear their opinion about the recommendations.

A formative evaluation is applied to materials that are being developed (Tessmer, 2001). In this research project, the developed materials are the recommendations about the degree in which the courses serve adults with several learning styles, combined with the recommendations about the use of interaction methods in the blended learning environment that Klink (2006) had written.

Usually a formative evaluation is conducted with a small sample size (Worthen & Sanders, 1987). In this research project the formative evaluation was undertaken with 2 lecturers and 11 students (6 RMME: 5 face-to-face , 1 online student; and 5 OTE students: 2 face-to-face, 3 online students).

Interviews lecturers

In the second round of interviews a formative evaluation was undertaken to evaluate what the lecturers thought of the found conclusions and suggested improvements. The emphasis was – from their courses point of view – on the underlying idea if the suggested improvements for their course were practical. Did they have more suggestions for improvement concerning the way the courses served adults with several learning styles? After that round of interviews, the suggested improvements were adjusted one more time, to make sure it were practical improvements that could be used in real time.

The RMME and OTE course had their own lecturer who was responsible for the education of that course. The two interviewed lecturers were the only lecturers teaching this course.

Interviews students

In the second round of interviews a formative evaluation was undertaken to evaluate what the students thought of the found conclusions and recommendations for improvement. The emphasis was – from the students point of view – on the underlying idea if the suggested improvements were practical. Did they have more suggestions for improvement concerning the way the courses served adults with several learning styles? After this round of interviews, the suggested improvements were adjusted one more time, to make sure it were practical improvements that could be used in real time.

The choice was made to also use the same students that were interviewed in the evaluation phase (n=8), because these students were more involved in the research project and that way they would give more detailed information. They knew what the research project was about and what the purpose of the project was.

To get more additional information about the students opinion of the recommendations, all students of the RMME and OTE course were sent an e-mail with the question to react on the recommendations. Even after sending a reminder, only two face-to-face students of the RMME course and one online students of the OTE course responded.

After the formative evaluation the conclusions and recommendations were adjusted.

Finally, an implementation plan was written based on the conclusions and recommendations to improve the degree to which the courses serve adults with several learning styles. This implementation plan gave an answer to the main question:

‘How can the ‘Research Methods in a Multidisciplinary Environment’ (RMME) and ‘Operational Test and Evaluation’ (OTE) courses of the LMEF Masters program ensure best teaching practice, so that several adult learning styles are addressed?’. The implementation plan itself can be found in appendix 9.

Validity

For the formative evaluation of the recommendations, the same students were interviewed as during the interviews in the evaluation phase to answer research question one. To improve the internal validity, the recommendations were sent to all the students, with the request to respond to it within 3 weeks. This was done because the more responses received, the higher the internal validity. A high internal validity is important when one wants to be sure that the right meaning to the results was given and that the right conclusions were drawn (Van Berkel & Starren, 1993). Even after sending a reminder, only two students of the RMME course and one student of the OTE course responded. One cannot speculate what the students who did not respond would say about the suggested recommendations.

4 Results research question 1 RMME

In this chapter conclusions of the results of the evaluation phase for the RMME course will be presented that answers the question: ‘What is the quality of the RMME course of the LMEF Masters program by looking at the degree in which the course can serve adults with several learning styles?’

This chapter also answers the following underlying questions:

- a) To what extent do the courses RMME and OTE reckon with the fact that adults learn in different ways?
- b) Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?
- c) Which of the characteristics of adult learning styles are already implemented correct in the RMEE and OTE courses?

First the results of each activity will be presented. Finally, in section 4.5 answers to the above questions will be given.

In this chapter also the implemented and attained curriculum for the RMME course of Van den Akker’s (2004) Typology of Curriculum representations will be explained. In the different activities of the evaluation phase this is made clear in the opinions given by the lecturer and the students.

In section 4.1 a summary of the results of the course website will be presented. In section 4.2 a summary of the results of the AITEC questionnaire in 2003 and 2004 will be presented. In section 4.3 a summary of the results of the developed questionnaire will be presented and in section 4.4 a summary of the results of the interviews with students and the lecturer of the course are presented. Finally, in section 4.5 the conclusions of the results for this course are summarized by research question.

The results of each activity can be found in appendix 4.

When there is talked about ‘students’ it means face-to-face and online students. When this is not the case, it will be said otherwise. When there is spoken about some students, this means that this could be 2 students or less. When there is spoken about most students, this means 3 students or more.

4.1 Results from the analysis of the course website

One of the first activities that took place was the analysis of the course website. The focus was on the evaluation criteria mentioned in chapter 2. Below, a summary of the results will be presented. The results are subdivided into adult learning characteristics and learning styles/teaching methods.

Adult learning characteristics

Students could do this course without any necessary prerequisite skills, this was made clear in the course outline document that was provided in the course website. In this document the aims and objectives could also be found, the same goes for a section about the assignments and assignment criteria. This document showed a lot of important information for the course and it is very helpful for the students. On the university website some information was

provided about the content of the course, but this was not detailed and it was not really showing what the course was about. This information could be more extensive. Relevant materials for making assignments, like chapters of a book and additional articles and references, were provided by the lecturer on the course website. There were several links offered for help for administrative support on the university website and the course website. Because there were a lot of links, students could get lost in all the provided information, or get distracted from the actual problem. In the course website there was one page called 'Getting Help'. This was a very helpful page, but this page also offered a lot of other links, once the students get outside the course website, in which they could get lost. Contact details (e-mail address and phone number) from the lecturer were available, so students could ask the lecturer for help too. Students could ask the lecturer for contact details of other students; this information was not provided on the course website. The website made use of the discussion board. This is where the students could have group-interaction, but it was not used very often. Students could also have interaction with each other in the face-to-face meetings, but this was not possible for the online students. Students had to write a research proposal at the end. The information provided on the website was making clear that students could choose their own topic/problem. They could choose a topic related to their work. It is most likely that this will motivate the students and help them combine their work and their study better. General feedback on assignments was provided on the notice board. This way all students, face-to-face and online, can read this and learn from it.

Learning style/Teaching methods

The course website mainly used PowerPoint presentations and articles: mainly the learning style reading must be used by the students in this course. There was not a lot of variation in teaching methods; this could be improved by offering the students more different teaching methods.

4.2 Results from the AITEC questionnaire

One of the activities of the evaluation phase was analysing the AITEC questionnaires of 2003 and 2004. This was done to determine the profile of the RMME course the LMEF Masters at SEEC at that moment. The focus was on the criteria mentioned in chapter 2.

In sub-sections 4.2.1 and 4.2.2 a summary of the results of the AITEC questionnaire of 2003 and 2004 will be presented.

In appendix 4, the results of the AITEC questionnaire 2003 and 2004 are presented in percentages.

4.2.1 Summary of the results from the AITEC questionnaire RMME 2003

Students felt that they had adequate pre-requisite knowledge of the demands of the course and that the aims and objectives were clear. The course developed their understanding of concepts and principles. The course material was relevant to their work and pitched at the appropriate level. The assessment requirements were relevant and clear and the workload for this course was reasonable. The university application and enrolment phase was well managed and appropriate administrative support was available. The course encouraged and facilitated opportunities to interact with DSTO colleagues. The students were satisfied with the lecturer; he had sufficient knowledge of the subject matter, was well prepared and showed enthusiasm for the course. Academic support outside the face-to-face teaching was available.

The advertisement and explanation of the CEI program must be improved. Students were not able to manage their study demands and work commitments effectively. Students want to have more ready access to online materials and text books. Not all students thought that the lecturer provided suitable support for the learning process and there were not enough opportunities for group/class interaction and collaboration available for all students. This is something that the lecturer has to improve. The students were not satisfied about the effectiveness of the delivery mode. They had to sit in class all day and they had to repeat what was told in the lecture slides; this was not effective for them, so the delivery mode needs more attention and variation.

Most students felt that the venue and facilities were not appropriate. This needs to be improved. Most students felt that there was a lack of feedback, they would like to have this more.

4.2.2 Summary of the results of the AITEC questionnaire RMME 2004

Students felt that the course content met their expectations and that the course materials/resources enhanced their learning. The assessment requirements were fair and the course delivery mode was effective. The students were satisfied with the lecturer; he was knowledgeable, enhanced their understanding of the subject and he created an environment conducive to learning. The workload was reasonable and the course was relevant to their work. The university facilities and equipment were suitable.

The feedback on the students' work needs to be improved, it was not adequate.

4.3 Results of the questionnaire developed by the researchers

In section 4.2 summaries of the results of the AITEC questionnaires were presented. To get additional and more recent information about the specific topics of adult learning and learning styles, a new questionnaire was developed. In this section a summary is provided of the results retrieved from this questionnaire.

The developed questionnaire can be found in appendix 3; the responses on the developed questionnaire can be found in appendix 4.

Summary of the results of the developed questionnaire

According to the online students, there were no major strengths. Online students had the feeling that they were neglected in comparison to the face-to-face students. The overall course did not contribute to the online students' knowledge. This is something that the lecturer has to work on, he should pay more attention to the online students and make the learning environment more attractive for them. This can be done by offering more variation in interaction (teaching) methods. The instructional and presentation techniques used in the course did not assist the online students in learning the material, the same can be said about the used instructional materials and aids. The material could not be related to their particular life situation and the lessons were not presented in steps that the online students could follow. The online students would like to have more interaction with other students and with the lecturer. The program schedule was not well planned.

According to the online students, the PowerPoint slides must be more comprehensive. Because the online students cannot attend the classroom sessions they need more explanation. The learning environment was not attractive for them, because there were only PowerPoint slides. That is why for online students, there needs to be more variety in teaching methods.

The face-to-face students were more positive about their learning environment: According to them, the lectures were well thought and presented. Because of this, the face-to-face students enjoyed the course; the overall course contributed to their knowledge. Teaching materials were 'tailor-made' to the workplace and tutorial and group aspects were presented in the lectures. For face-to-face students there was enough assistance in learning the material and the lecturer presented the lessons in steps they could follow. They were satisfied with the way the lecturer communicates with them.

It was hard for the face-to-face students to keep concentration for a whole day of lectures. They would like to have more variety in the way topics are presented during these classroom sessions.

All students would like to receive more feedback on assignments. The online students would also like to receive more timely and personalized feedback from the lecturer.

4.4 Results from the interviews with students and the lecturer of the RMME course

Besides analysing the course website, analysing the questionnaire of AITEC and analysing the developed questionnaire, also interviews with students of the OTE course and the lecturer were undertaken. In chapter 2 the focus for this research was explained. Evaluation criteria were determined. In the interviews with the students and professor the focus was on these evaluation criteria. So, the focus was on adult learning and characteristics of adult learners, it was explained what learning styles are and how one should take them into account when teaching a course to adults.

In this section a summary of the responses of the students and the lecturer will be given. The summary is provided in table 3 and made clear with a distinction in - -, -, +/-, = and ++. The results of the interviews with students and the lecturer can be found in appendix 4.

The use of adult learning characteristics, learning styles and teaching methods in the RMME course, according to the students:

- ++ = All questioned students or the lecturer were satisfied.
- + = Most questioned students (3 students or more) or the lecturer were satisfied.
- +/- = Some questioned students (2 students or less) or the lecturer were satisfied.
- = Most questioned students or the lecturer were not satisfied.
- - = All questioned students or the lecturer were not satisfied.

The use of adult learning characteristics, learning styles and teaching methods in the RMME course, according to the lecturer:

- ++ = The questioned lecturer was really satisfied.
- + = The questioned lecturer was satisfied.
- +/- = The questioned lecturer was undecided.
- = The questioned lecturer was not satisfied.
- - = The questioned lecturer was really not satisfied.

Table 3

Results interviews with students and the lecturer of the RMME course.

	Students		Lecturer
	Face-to-face	Online	
Adult learning characteristics			
Goal for doing this course	Getting their Masters degree	Getting their Masters degree	Getting their Masters degree
Important to pas for this course	For themselves and to get a promotion in the future	For themselves and to get a promotion in the future	For themselves and to get a promotion in the future
Comfortable with learning	+	+	+
Motivation	+/-	+/-	
Level of the content	+	+	
Assignments	+/-	-	
Workload	++	++	++
Interaction facilities	+/-	-	+/-
Group-work	-	-	-
Lectures	+/-	+/-	+/-
Feedback	--	--	-
Materials	++	++	++
Knowledge of the lecturer	++	++	++
Guidance from the lecturer	+	-	
Motivation by the lecturer	+	--	+
Personal background and the lecturer	-	-	-
Examples used	++	++	++
Learning styles			
<i>Preferences</i>	Reading	Reading	Audio, working together and discuss
Teaching methods			
	-- (Not a lot of variation, they would like to have this more.)	-- (Not a lot of variation, they would like to have this more.)	

In general, the lecturer and the face-to-face students agreed. The online students disagreed most of the time with the face-to-face students and the lecturer. The major comment of the students and the lecturer was that the course needed more variation in the way it presented the material.

4.5 Conclusions RMME

In section 4.1 – section 4.4 the summaries of the results of the activities in the evaluation phase for the RMME course were presented. In this section (section 4.5) the conclusions of the results are summarized as either positive aspects (sub-section 4.5.1), aspects that can be

improved (sub-section 4.5.2) and learning style preferences of the students (sub-section 4.5.3). Finally, an overall conclusion (section 4.6) will be given. This way an answer to research question 1 ‘What is the quality of the RMME course of the LMEF Masters program by looking at the degree in which the course can serve adults with several learning styles?’ and the underlying questions ‘To what extend do the courses RMME and OTE reckon with the fact that adults learn in different ways?’, ‘Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?’ and ‘Which of the characteristics of adult learning styles are already implemented correct in the RMEE and OTE courses?’ will be given.

The quality of the RMME course is made clear in the positive aspects (sub-section 4.5.1) and the overall conclusion.

4.5.1 Positive aspects of the RMME course

The positive aspects are based upon the analysis of the course website, the results of the AITEC questionnaire 2003 and the results of the AITEC questionnaire 2004, the developed questionnaire and the interviews with students and the lecturer. They are divided under three headings: adult learning characteristics, learning styles and teaching methods.

This section answers the questions ‘To what extend do the courses RMME and OTE reckon with the fact that adults learn in different ways?’, ‘Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?’ and ‘Which of the characteristics of adult learning styles are already implemented correct in the RMEE and OTE courses?’.

Adult learning characteristics

- The students had adequate pre-requisite knowledge for the demands of this course. The aims and objectives were provided in the course outline document, they were clear.
- The content of the course fit with the work of the students. The lecturer knew in general what kind of work the students did.
- The workload for this course was good. There was an adequate amount of time selected for each topic.
- The face-to-face students were pleased with the lecturer. They could be motivated by him and they got enough guidance. All students thought the lecturer had sufficient knowledge of the subject matters discussed in the course. The lecturer made the students feel comfortable with learning by his way of presenting subjects and the way he dealt with questions. He was approachable and easy to ask questions, and he enhanced the understanding of the subject for the students. The students found the lecturer well prepared and he showed enthusiasm for the course.
- General feedback was provided by the lecturer on the notice board.
- Materials for this course could be reached easily.
- Students were challenged by the content of the course and the way the material was taught.
- The course content did meet the expectations of the students.
- There were a lot of hyperlinks for online help provided. There was also a document provided how to learn online and an instruction was provided with steps about where to find information. The contact details (e-mail and phone number) of the lecturer were provided.
- The students thought that appropriate administrative support was available. The university application and enrolment phase was well managed. The university facilities and equipment was suitable.

Learning styles

The teaching methods used in this course fit with the preferred learning styles of the students (reading).

Teaching methods

- For face-to-face students there were enough possibilities to interact with other students. There is a discussion board on the course website where they can interact with other students, and the tutorials gave opportunity to work together and discuss.
- The assignments were relevant to the work situation of the students. The assignments fit with the content of the course, have a good level and they were clear for the face-to-face students. Students can choose their own topic for writing their proposal.
- There was rehearsal of some content. The lectures were helping the face-to-face students.
- The examples used in the PowerPoint presentations and the workshops were relevant and understandable for the students.
- The textbook used in this course had a website with quizzes. The students could do those, informal.

4.5.2 Aspects that can be improved in the RMME course

The aspects that can be improved are based upon the analysis of the course website, the results of the AITEC questionnaire 2003 and the results of the AITEC questionnaire 2004, the developed questionnaire and the interviews with students and the lecturer. They are divided under three headings: adult learning characteristics, learning styles and teaching methods. This section answers the questions 'To what extent do the courses RMME and OTE reckon with the fact that adults learn in different ways?' and 'Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?'.

Adult learning characteristics

- The CEI program was not well advertised and explained. So, it was not clear for the students what they should expect of the course before the course started.
- The lecturer spent no time on an introduction, a lot of students did not know each other and they did not know the people with whom they were in the groups.
- The lecturer did not know the personal backgrounds of the students and online students could not relate the material to their particular life situation.
- For online students there was not enough guidance from the lecturer and they could not be motivated by him.
- The online students had never met or spoken to each other.
- Feedback on assignments was not always timely. The students did not get any marks back yet, so they did not know how far learning had progressed. Students did not always receive personalized feedback from the lecturer.
- The online students thought that the lecturer did not communicate well with them. The lecturer made not enough effort to help them feel comfortable, and he could not hold their interest.
- According to the online students, the program schedule was not well planned (for example, allowing enough time between sessions).

Learning styles

For other learning styles than reading there were not a lot of possibilities to learn, especially not for online students.

Teaching methods

- Group work was not working very well, students found it difficult and the discussions did not contribute to their learning process.
- There was not a lot of online interaction with the lecturer and other students; the discussion board was not used very much.
- For online students there were not enough possibilities to interact with other students.
- There was not a lot of variation in the way the lecturer presented the content. For the online students there was no variation.
- The instructional and presentation techniques used (transparencies, manuals, videotapes, and the like) were not adequately assisting the online students in learning the material nor were they enhancing their learning process.
- The lecturer did not present the lesson in steps that the online students could follow.
- It was not clear for online students what was expected from the assignments.
- Students did not prefer to have a whole day of lectures.

4.5.3 Learning style preferences

As mentioned in chapter two, Kolb used a four-type definition of learning styles: diverging, assimilating, converging and accommodating. The use of each of these learning style preference in the RMME course will be discussed in this section.

This section answers the questions ‘To what extent do the courses RMME and OTE reckon with the fact that adults learn in different ways?’ and ‘Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?’. During the several activities undertaken in this phase, there was analysed which teaching methods were used and were possible for adult learners in the RMME course. These results were compared with the results of the literature results. This resulted in the following conclusions:

1. Diverging (feeling and watching – Concrete experience/Reflective observer)

The face-to-face students with a diverging learning style are able to use their learning style while working in groups. During the classroom sessions they can explore the topic discussed that day and hear other students’ opinion. During the guest-lectures presented in the classroom session, the face-to-face students with the diverging learning style hear topics presented from different perspectives. For online students with the diverging learning style these things were not possible. All students got enough time to think things through.

2. Assimilating (watching and thinking - Abstract conceptualization/Reflective observer)

The assimilating learning style students can find benefit in the well-prepared lectures presented by the lecturer. They really like it that that lecturer is knowledgeable, this helps them with learning. For online assimilating students learning is difficult, because they are not comfortable with learning because they have the feeling they do not get enough guidance of the lecturer. All assimilating students were following the assignment guidelines, and can work good on their own. However, because the assignment guidelines were not clear for the online students, this was very frustrating. Face-to-face students could get an answer to their questions in the classroom sessions, so the lecturer could provide them with answers. The content of the course fits with the assimilating learning style, because students with the assimilating learning style are more interested in theoretical concepts, models and systems. The PowerPoint slides could contain more graphics or diagrams to represent the information. All the assimilating students got enough time to think things through and see where there are relations between the concepts.

3. Converging (Abstract conceptualization/Active experimenter)

Online converging students did not have big problems with the fact that they could not work in groups, they preferred to deal with the assignments on their own. All students with the converging learning style would like to have more teaching methods in which they can apply their knowledge, this way they would learn more, than from only reading PowerPoint slides. The students with the converging learning style learned most from the last assignment, writing a proposal. In this proposal they could focus on the practical application of the theories discussed in the rest of the course.

4. Accommodating (doing and thinking - Concrete experience/Active experimenter)

The students with the accommodating learning style would like to have more exercises in which they can be active. Especially for online students there is no variety in teaching methods. The face-to-face students with the accommodating learning style learned a lot from the guest-lectures. This way they could hear what other people, besides the lecturer thought of a topic. In these guest-lectures there were case-studies presented. This way the students could hear and see what other people had done, this helped them with their learning process. The online accommodators did not have these possibilities, but they could learn a lot from it. Accommodators learn a lot from problem solving, this was not offered in the course. More diagrams and schedules could be offered in the PowerPoint slides, to make clear what the relationships between topics were.

To see which online interaction methods students preferred, a reference is made to the research results of Klink (2006).

4.6 Overall conclusion

The results of the evaluation phase for the RMME course answered the question: ‘What is the quality of the RMME course of the LMEF Masters program by looking at the degree in which the course can serve adults with several learning styles?’. According to the results, the RMME course is a good, clear course in which the students can learn a lot of things they can use in their work. Especially for face-to-face students who can attend the classroom sessions this course is worthwhile. However, the online students are very unsatisfied. They can only read the lecture notes and provided articles. They do not have interaction with other students or with the lecturer. For them, there is no variety in teaching methods used. Because the lecturer does not provide adequate and timely feedback, the students do not know how far their learning has progressed. The group work is not going really well, there needs to be more attention for this.

So, this course needs to pay more attention to the online students and there needs to be more variety in teaching methods, so that more learning styles are addressed.

5 Results research question 1 OTE

In this chapter conclusions of the results of the evaluation phase for the RMME course will be presented that answers the question: ‘What is the quality of the RMME course of the LMEF Masters program by looking at the degree in which the course can serve adults with several learning styles?’

This chapter also answers the following underlying questions:

- a) To what extent do the courses RMME and OTE reckon with the fact that adults learn in different ways?
- b) Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?
- c) Which of the characteristics of adult learning styles are already implemented correct in the RMEE and OTE courses?

First the results of each activity will be presented. Finally, in section 5.5 answers to the above questions will be given.

In this chapter also the implemented and attained curriculum for the OTE course of Van den Akker’s (2004) Typology of Curriculum representations will be explained. In the different activities of the evaluation phase this is made clear in the opinions given by the lecturer and the students.

In section 5.1 a summary of the results of the course website will be presented. In section 5.2 a summary of the results of the AITEC questionnaire in 2003 and 2004 will be presented. In section 5.3 a summary of the results of the developed questionnaire will be presented and in section 5.4 a summary of the results of the interviews with students and the lecturer of the course are presented. Finally, in section 5.5 the conclusions of the results for this course are summarized.

The results of the different activities itself can be found in appendix 5. When there is talked about ‘students’ it means face-to-face and online students. When this is not the case, it will be said otherwise. When there is spoken about some students, this means that this could be 2 students or less. When there is spoken about most students, this means 3 students or more.

5.1 Results from the analysis of the course website

One of the first activities that took place was the analysis of the course website. The focus was on the evaluation criteria mentioned in chapter 2. Below, a summary of the results of this analysis will be presented. The results are subdivided into adult learning characteristics and learning styles/teaching methods.

Adult learning characteristics

The course outline document that was provided in the course website provided the aims and objectives of the OTE course. In this document a section about the assignments and assignment criteria was provided. This document showed a lot of important information for the course and it would be very helpful for the students. On the university website some information was provided about the content of the course, but this was not detailed and it was not really showing what the course was about.

The lecturer tried to ensure that all students had the same pre-requisite skills by providing the textbook used in the pre-requisite for this course in the 'Additional Resources' section on the website. This way students could revise details they may have forgotten or did not know. Relevant materials for assignments and additional articles and references were provided by the lecturer on the course website. All materials were provided online. There were several ways offered for support, like contact details of the Program Support Officer when students have administrative problems. There were several links offered for help on the university website and the course website. Because there were a lot of links, students could get lost in all the provided information, or get distracted from the actual problem. In the course website there was one page called 'Getting Help'. This was a very helpful page, but this page also offered a lot of other links in which the students could get lost. Contact details (e-mail address and phone number) from the lecturer were available, so students could ask the lecturer for help too. The website made use of the discussion board. This is where the students could have group-interaction, but it was not used very often. Students who wanted to make their contact details available to other students could post them on the discussion board; this was not done. Students could also have interaction with each other in the face-to-face meetings, but this was not possible for the online students. Students had to write a paper at the end. The information provided on the website was making clear that students could choose their own topic/problem. They could choose a topic related to their work. It is most likely that this will motivate the students and help them combine their work and their study better. No general feedback on assignments was provided on the notice board or anywhere else in the course website.

Learning style/Teaching methods

The course website mainly provided PowerPoint presentations and tutorials. One of the last assignments was writing a research paper, so they had to use all their learned skills in this assignment. The last assignment was about reviewing somebody else's paper. Next to this, the students had to read articles and the book belonging to this course. Students had to watch a video too; this was not provided on the website. Even though, there was not a lot of variation in teaching methods.

5.2 Results from the AITEC questionnaire

One of the activities of the evaluation phase was analysing the AITEC questionnaires of 2003 and 2004. This was done to determine the profile of the OTE course the LMEF Masters at SEEC at that moment. The focus was on the criteria mentioned in chapter 2. In sub-sections 5.2.1 and 5.2.2 a summary of the results of the AITEC questionnaire of 2003 and 2004 will be presented.

In appendix 5 the results of the AITEC questionnaire 2003 and 2004 are presented in percentages.

5.2.1 Summary of the results from the AITEC questionnaire 2003

The students felt that they had adequate pre-requisite knowledge of the demands of the course and that the aims and objectives were clear. The course developed their understanding of concepts and principles. The course material was relevant to their work and pitched at the appropriate level. The workload for this course was reasonable and the university application and enrolment phase was well managed. The course encouraged and facilitated opportunities to interact with DSTO colleagues. The students were satisfied with the lecturer; the lecturer

had sufficient knowledge of the subject matter, was well prepared and showed enthusiasm for the course. The venue and facilities were appropriate and the advertisement and explanation of the CEI program was good. Academic support outside the face-to-face teaching and appropriate administrative support was available. Students had ready access to online materials and text books.

There needs to be more opportunities for group/class interaction and collaboration available. The assessment requirements need to be more relevant and clear. Not all students could manage their study demands and work commitments effectively. The students were all undecided about the statement that the lecturer provided suitable support for the learning process.

The online students did not like it that they had no workshops to go to. They thought the workload was a little high and the due dates were not very flexible.

5.2.2 Summary of the results of the AITEC questionnaire 2004

The students were pleased with the lecturer. They felt that he was knowledgeable, he enhanced their understanding of the subject and he created an environment conducive to learning. The students received adequate feedback on their work and the university facilities and equipment were suitable. The course materials/resources enhanced their learning, the workload was reasonable and the course was relevant to their work. For most students, the course content met their expectations and the course delivery mode was for most of them effective. The assignments were challenging and interesting.

The students liked the idea of working in groups, but it was difficult to deal with the group dynamics while working in groups. This is something that needs to get some attention before starting to work in groups. Not all students were pleased with the way the lectures were divided through the course. Finally, some students thought the assessment requirements were not fair, so they need to become more clear to all students.

5.3 Results of the questionnaire developed by the researchers

In section 5.2 summaries of the results of the AITEC questionnaires were presented. To get additional and more recent information about the specific topics of adult learning and learning styles, a new questionnaire was developed. In this section a summary is provided of the results retrieved from this questionnaire.

The developed questionnaire can be found in appendix 3; the responses on the developed questionnaire can be found in appendix 5.

Summary of the results of the developed questionnaire

It was easy for the students to access lecture notes, course information, reference material and assessment notes on the website. The course was well structured and programmed. The courses website was easy to interpret and navigate throughout. The experience of the lecturer with the defence field was helpful for the students to relate their experience with the lecturing materials and examples.

The amount of online interaction with the lecturer and other students was not sufficient for all the students. All the students would like to get course material and coursework earlier, so they

can adjust their personal life situation to it. All students would like to discuss more with each other, especially about examples.

The instructional and presentation techniques used were not adequately assisting the face-to-face students in learning the material. The lecturer did not provide the online students with adequate assistance in learning the material. The online students would like to have classroom sessions. They would like to get an answer on their questions quicker than they get it now. For the online students, the online notes need to be more specific. Online students preferred to get printed copies of lessons and coursework as it takes them a lot of time to download everything and print it.

5.4 Results from the interviews with students and the lecturer of the OTE course

Besides analysing the course website, analysing the questionnaire of AITEC and analysing the developed questionnaire, also interviews with students of the OTE course and the lecturer were undertaken. In chapter 2 the focus for this research was explained. Evaluation criteria were determined. In the interviews with the students and professor the focus was on these evaluation criteria. So, the focus was on adult learning and characteristics of adult learners, it was explained what learning styles are and how one should take them into account when teaching a course to adults.

In this section an overview of the responses of the students and the lecturer will be given. The summary is provided in table 4 and made clear with a distinction in --, -, +/-, = and ++. The results of the interviews with students and the lecturer can be found in appendix 5.

The use of adult learning characteristics, learning styles and teaching methods in the RMME course, according to the students:

- ++ = All questioned students or the lecturer were satisfied.
- + = Most questioned students (3 students or more) or the lecturer were satisfied.
- +/- = Some questioned students (2 students or less) or the lecturer were satisfied.
- = Most questioned students or the lecturer were not satisfied.
- = All questioned students or the lecturer were not satisfied.

The use of adult learning characteristics, learning styles and teaching methods in the RMME course, according to the lecturer:

- ++ = The questioned lecturer was really satisfied.
- + = The questioned lecturer was satisfied.
- +/- = The questioned lecturer was undecided.
- = The questioned lecturer was not satisfied.
- = The questioned lecturer was really not satisfied.

Table 4

Results of interviews with students and the lecturer of the OTE course.

	Students		Lecturer
	Face-to-face	Online	
Adult learning characteristics			
Goal for doing this course	Getting their Masters degree and the only course available at that	Getting their Masters degree and the only course	Getting their Masters degree

	time	available at that time	
Important to pas for this course	For themselves	For themselves	For themselves
Comfortable with learning	++	++	++
Motivation	+/-	+/-	
Level of the content	+	+	
Assignments	+/-	+/-	+
Workload	++	++	++
Interaction facilities	+/-	+/-	+/-
Group-work	-	-	+/-
Lectures	+/-	+/-	+/-
Feedback	++	++	++
Materials	++	++	++
Knowledge of the lecturer	+	+	++
Guidance from the lecturer	++	++	++
Motivation by the lecturer	++	++	++
Personal background and the lecturer	-	-	+/-
Examples used	++	++	++
Learning styles			
<i>Preferences</i>	Reading	Reading	Reading, making assignments and discussing.
Teaching methods			
	+/- (Not a lot of variation.)	+/- (Not a lot of variation.)	+ (Variety in assessment climate; different kinds of assignments.)

In general, the students and the lecturer agreed. The major comment of the students was that the course needed more variation in the way it presented the material. Online students would like to have face-to-face classroom sessions. Students would like to know each others background. The students were satisfied with the way they received feedback.

5.5 Conclusions OTE

In section 5.1 – section 5.4 the summaries of the results of the activities in the evaluation phase for the OTE course were presented. In this section (section 5.5) the conclusions of the results are summarized as either positive aspects (sub-section 5.5.1), aspects that can be improved (sub-section 5.5.2) and learning style preferences of the students (sub-section 5.5.3). Finally, an overall conclusion (section 4.6) will be given. This way an answer to research question 1 ‘What is the quality of the RMME course of the LMEF Masters program by looking at the degree in which the course can serve adults with several learning styles?’ and the underlying questions ‘To what extend do the courses RMME and OTE reckon with the fact that adults learn in different ways?’, ‘Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters

program?’ and ‘Which of the characteristics of adult learning styles are already implemented correct in the RMEE and OTE courses?’ will be given.

The quality of the RMME course is made clear in the positive aspects (sub-section 5.5.1) and the overall conclusion.

5.5.1 Positive aspects of the OTE course

The positive aspects are based upon the analysis of the course website, the results of the AITEC questionnaire 2003 and the results of the AITEC questionnaire 2004, the developed questionnaire and the interviews with students and the lecturer. They are divided under three headings: adult learning characteristics, learning styles and teaching methods.

This section answers the questions ‘To what extent do the courses RMME and OTE reckon with the fact that adults learn in different ways?’, ‘Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?’ and ‘Which of the characteristics of adult learning styles are already implemented correct in the RMEE and OTE courses?’.

Adult learning characteristics

- The aims and objectives of the course were provided in the course outline document.
- The course content met the expectations of the students. The content fit with the work of the students and with their basis knowledge. This was made possible by the lecturer, because he provided chapters of a text book to make sure all students had the right pre-requisite skills.
- The workload of the course was good; there was an adequate amount of time selected for each topic.
- The lecturer knew in what background the students worked (defence) and that they all had a certain level.
- The lecturer had sufficient knowledge about the topics discussed, because he could explain the theory in several ways and he could use a lot of real life examples. He was well prepared, showed enthusiasm for the course and communicated well with the students. The lecturer made the students think for themselves and he provided enough guidance to the students when there was a problem or a question.
- The materials were easy to reach. Everything was on the website, provided by the lecturer; the students did not have to go to a library.
- The course materials/resources enhanced the learning of the students.
- Feedback on assignments was clear, extensive and reasonably timely. Students also received personalized feedback.
- University facilities and equipment were suitable, the university application and enrolment phase was well managed and the administrative support was appropriate. There were a lot of hyperlinks provided for help.
- The course developed the understanding of concepts and principles of the students. The overall course contributed to their knowledge and/or basic skill base.

Learning styles

The course was organized that way that students had to work in the same way: reading, making assignments and discussing it with group members.

Teaching methods

- The lecturer made the students feel comfortable with learning, by explaining every little detail, particularly for individual assignments. The lecturer also provided a template for assignments.

- The lessons were presented in steps that students could follow. An instruction was provided on the course website with steps about where to find information on the website.
- The lecturer could motivate the students by organizing the workshops, by giving all the feedback and by taking them serious.
- The students were encouraged by the lecturer's humour and examples used in the lectures. He held their interest. The students could relate to the topics he used.
- The instructional materials and aids used (transparencies, manuals, videotapes, and the like) were enhancing the learning process of the students; the students were challenged by it.
- The course encouraged and facilitated opportunities to interact with fellow students by the way it had been planned in tutorial groups. In these tutorials students could learn from discussing with other students.
- The assignments were challenging and interesting and the assignment requirements were relevant and clear. There was variation in the assignment climate, because there were different kinds of assignments.

5.5.2 Aspects that can be improved in the OTE course

The aspects that can be improved are based upon the analysis of the course website, the results of the AITEC questionnaire 2003 and the results of the AITEC questionnaire 2004, the developed questionnaire and the interviews with students and the lecturer. They are divided under three headings: adult learning characteristics, learning styles and teaching methods. This section answers the questions 'To what extend do the courses RMME and OTE reckon with the fact that adults learn in different ways?' and 'Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?'.

The suggested improvements mentioned only in the AITEC questionnaire 2003 were not taken into consideration in the rest of this research. This is because these improvements are only mentioned in the questionnaire of 2003 and did not come back in the questionnaire of 2004, the developed questionnaire or the interviews with students and lecturers. So they were not relevant anymore and have most likely been improved in the last two years.

Adult learning characteristics

- The CEI program was well advertised and explained, so the students knew what to expect from this course.
- It was difficult for the students to motivate themselves when they were busy with work and things at home.
- The lecturer did not know anything about the personal backgrounds of the students. This would be helpful, because that would help with explaining and using examples. There was also no real introduction to each other in the groups; that was not helping with interacting.
- The students could put contact information on the website, on the discussion board, but students did not do this. All students answered neutral to the question if the lecturer provided suitable support for the learning process and there was no general feedback found on the website.
- Some students thought the lecturer had enough real life experience, but he was not theoretical and scientific enough.
- Most of the interviewed students preferred to have more workshops, because then you could meet and interact with each other.
- Students could get lost in all the hyperlinks provided for help if they get outside the course website.

Learning styles

There was not a lot of variety in teaching methods, so the students had to learn a lot in the same way and could not use their own preferred learning style.

Teaching methods

- The course did not encourage and facilitate opportunities to interact with fellow students; it was up to the students to do that.
- Most students did not like the group work, they did not learn from fellow students. The culture was that everyone rather did the assignments individually. Everyone was a bit judgemental to each other.
- It was not clear to all students what was expected from the assignments (how much they had to do). Not all students thought that the assessment requirements were fair.
- Some students would like to have more variety in teaching methods: reading, thinking, hearing, asking questions, applying and discussing with other students.

5.5.3 Learning style preferences

As mentioned in chapter two, Kolb used a four-type definition of learning styles: diverging, assimilating, converging and accommodating. The use of each of these learning style preference in the OTE course will be discussed in this section.

This section answers the questions ‘To what extent do the courses RMME and OTE reckon with the fact that adults learn in different ways?’ and ‘Which of the teaching methods are best suited with the learning styles that fit with the RMME and OTE courses in the LMEF Masters program?’. During the several activities undertaken in this phase, there was analysed which teaching methods were used and were possible for adult learners in the RMME course. These results were compared with the results of the literature results. This resulted in the following conclusions:

1. Diverging (feeling and watching – Concrete experience/Reflective observer)

The students with a diverging learning style are able to use their learning style while working in groups. During the classroom sessions they can explore the topic discussed that day and hear other students’ opinion. There were no guest-lectures, so the students could not hear topics presented from different perspectives. They had to hear these different perspectives from their group-members. One of the last assignments in this course, giving feedback on somebody else’s paper fits with the diverging learning style. This way students could read somebody else’s paper and received opinions from several people. All students got enough time to think things through.

2. Assimilating (watching and thinking - Abstract conceptualization/Reflective observer)

The assimilating learning style students can find benefit in the well-prepared lectures presented by the lecturer. They like it that that lecturer is knowledgeable and that he knows a lot about the defence field, this helps them with learning. All assimilating students were following the assignment guidelines, and can work good on their own, because the lecturer provided a template and grading points for the big assignments. However, the assignment guidelines were not clear for especially some online students. Face-to-face students could get an answer to their questions in the classroom sessions, so the lecturer could provide them with answers. Students with the assimilating learning style are more interested in theoretical concepts, models and systems, some students did miss this theoretical part in the lectures. All the assimilating students got enough time to think things through and see where there are relations between the concepts.

3. Converging (Abstract conceptualization/Active experimenter)

All students with the converging learning style would like to have more teaching methods in which they can apply their knowledge, this way they would learn more, than from only reading PowerPoint slides. The students liked it that they could choose from lectures provided on the course website that contained audio or no audio. The students with the converging learning style learned most from the last assignment, writing paper. In this paper they could focus on the practical application of the theories discussed in the rest of the course.

4. Accommodating (doing and thinking - Concrete experience/Active experimenter)

The students with the accommodating learning style would like to have more exercises in which they can be active, more variety in teaching methods. The tutorials made sure they had to discuss with other group members and the assignments are not all the same. Some PowerPoint presentations were about case studies. This way the students could hear and see what other people had done, this helped them with their learning process. Accommodators learn a lot from problem solving; this was not offered in the course. Diagrams and schedules could be offered more in the PowerPoint slides, to make clear what the relationships between topics were.

To see which online interaction methods students preferred, a reference is made to the research results of Klink (2006).

5.6 Overall conclusion

The results of the evaluation phase for the OTE course answered the question: 'What is the quality of the RMME course of the LMEF Masters program by looking at the degree in which the course can serve adults with several learning styles?'. According to the results, the OTE course in general is a good, clear course. The students were satisfied with the provided materials and received feedback. They liked to work in groups, but group work was not going really well. The atmosphere needs to be more collaborative and less individual, that is something on which more attention should be paid. The face-to-face workshops are very important for the students. The online students miss this in the course. Students would like to have more possibilities to interact with each other; especially online students will benefit if more interaction possibilities are available. There is a variety in teaching methods, but this can be more. So, this course needs to pay more attention to the online students and there needs to be more variety in teaching methods, so that more learning styles are addressed.

6 Results research question 2 RMME and OTE

In this chapter the results of the second phase that leads towards the recommendations will be presented that answered the question: 'How can the quality of the RMME and OTE courses of the LMEF Masters program be improved, by looking at the degree in which the courses can serve adults with several learning styles?'

This chapter also answers the following underlying question:

- a) Which of the characteristics of adult learning styles can be improved in the RMME and OTE courses?

In this chapter conclusions and recommendations are given to ensure best teaching practice of the RMME and OTE courses of the LMEF Masters. These conclusions and recommendation are based upon the results of the evaluation phase, see chapter 4 and 5.

Recommendations were given concerning the improvement of the degree in which the courses can serve adults who have several learning styles and the teaching methods that fit with these learning styles in the education. These recommendations covered different topics:

- Interaction
- Interaction (teaching) methods
- Feedback
- Assignments
- General recommendations

In total there were 34 recommendations of which three related to interaction, eighteen to interaction (teaching) methods, five to feedback, two about assignments and six general recommendations. If all recommendations would be mentioned, it would be too much, that is why they can be found in appendix 6.

The written recommendations were combined with the results of the evaluation of the recommendations from Klink (2006). In this chapter also her question is answered: 'How can the quality of the blended learning environment of the RMME and OTE courses of the LMEF Masters program be improved, with respect to the interaction methods?'. That is why the recommendations were also about the use of interaction methods in the blended learning environment. So in total, there was analysed if the interaction methods used in the blended learning environment fit with the characteristics and learning styles of the adult learners of the RMME course.

The combination of the two research projects can be explained by giving some examples: One of the characteristics of adult learners is that they would like to have timely and personal feedback. One aspect that belongs to interaction in a blended learning environment is real-human interaction. Especially online students would like to have more feedback and more real-human interaction. Adult learners would also like to have human interaction, so they can learn and benefit from other learners and the lecturer. This way, they are more motivated to learn. The recommendation that was written based on these findings is: 'It is advised that the lecturer calls the online students at least one time during the course. This way the online students have real-human interaction, they can ask questions and get instant feedback. This motivates them.'

A second example that can be given is the recommendation about the discussion board. One of the things that needed to be improved according to Klink (2006), was the use of the discussion board. It was not used very much, but it was easy accessible for students and the

lecturer. One of the things that needed to be improved according to the adult learning style research, was that the students did not know each other, most of them were not able to meet each other and most of the students would like to know more about each other. According to the literature, adult learners are more comfortable with learning when they know other students. A combination of these findings was made, and the following recommendation was written: 'It is advised that the lecturer creates a place on the discussion board where students have to submit their personal background information (picture and approximately ten sentences).'

A last example will be given about the use of the notice board. Klink's research project (2006) showed that the use of the notice board of the RMME course was not optimal. One of the findings in the literature research about adult learners was that they do not want to spend time on other things than learning. A combination of these two findings resulted in the following recommendation: 'It is advised to submit the newest information on top of the notice board.' This way the notice board is used better and adult learners do not have to scroll down every time they want to look at the notice board. This will save them time and it is more likely that they look at the notice board to see if new messages have been submitted.

Formative evaluation of the recommendations

After drawing conclusions and writing recommendations based upon the evaluation phase, a formative evaluation was conducted with the lecturers and students to evaluate what they thought of the recommendations. The recommendations had to be effective and/or efficient and/or interesting and motivating and/or practical and usable and/or acceptable (Tessmer, 2001). These criteria were checked with the students and lecturers by doing this formative evaluation.

The primary goal of this formative evaluation of the recommendations was to improve the quality of the blended learning environment of the RMME and OTE courses of the LMEF Masters program by looking at the degree in which the courses offer adult learners with different learning styles, different interaction methods.

Below, the results of the evaluation of the recommendations are presented. The recommendations used in this formative evaluation can be found in appendix 6. The results itself can be found in appendix 7 and 8. Section 6.1 will present the results of the formative evaluation of the recommendations. Section 6.2 will present the preferences for recommendations that the students and the lecturer had. Finally, in section 6.3 the conclusions of this formative evaluation of the recommendations will be presented.

6.1 Results formative evaluation of the recommendations

The courses that were analysed are the RMME and OTE courses of the LMEF Masters program. In this section the results of the formative evaluation of the recommendations will be presented. This way an answer is given to the sub-question 'Which of the characteristics of adult learning styles can be improved in the RMME and OTE courses?'. Section 6.1.1 will show the results of the students of both courses, section 6.1.2 will show the results of the lecturers.

6.1.1 Results of the students

Below, the results of this formative evaluation will be presented in table 5. The recommendations all received a number. One can see in appendix 6 which recommendation belongs to each number. The recommendations with respect to feedback are only for the

RMME course. This is because the results for the OTE course on research question 1 showed that the way the OTE students received feedback did not need to be improved. When there is spoken about some students, this means that this could be 2 students or less. When there is spoken about most students, this means 3 students or more.

Each recommendation received a value of ++, +, +/-, - or - - :

- ++ = All questioned students found the recommendation effective, efficient, interesting and motivating, usable and acceptable.
- + = Most questioned students found the recommendation effective, efficient, interesting and motivating, usable and acceptable.
- +/- = Some students found the recommendation effective, efficient, interesting and motivating, usable and acceptable.
- = Most questioned students did not find the recommendation effective, efficient, interesting and motivating, usable and acceptable.
- - = All questioned students did not find the recommendation effective, efficient, interesting and motivating, usable and acceptable.

Table 5

Results of the formative evaluation of the recommendations.

Recommendation number	Students RMME	Students OTE
Recommendations with respect to interaction		
1	+/-	+
2	++	++
3	+ (Online students: -)	+
Recommendations with respect to interaction (teaching) methods		
4	+	+
5	+ (Online students: -)	++
6	+/- (depends on the frequency)	+
7	+	+
8	++	++
9	+	-
10	++	+
11	+	++
12	+ (Online students: -)	++
13	+	-
14	+	-
15	+	++
16	+	+
17	++	++
18	+	++
19	++	+
20	+	+
21	+/-	++
Recommendations with respect to feedback		
22	++	
23	++	
24	++	
25	++	
26	++	
Recommendations with respect to assignments		
27	++	++
28	++	++

General recommendations		
29	++	++
30	++	++
31	++	++
32	For online students ++	++
33	++	++
34	+	++

6.1.2 Results of the lecturers

The lecturers of the RMME and OTE courses were also asked for their opinion about the recommendations.

Lecturer RMME

The following numbers belong to recommendations that the lecturer found effective and/or efficient and/or interesting and motivating and/or usable and/or acceptable:

1, 2, 3, 5, 6, 7, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34.

Lecturer OTE

The following numbers belong to recommendations that the lecturer found effective and/or efficient and/or interesting and motivating and/or usable and/or acceptable:

1, 2, 3, 4, 5, 6, 9, 12, 13, 17, 18, 20, 21, 28, 30, 31, 32, 33, 34

6.1.3 Differences between students and the lecturer

For the RMME course, there were no big differences between the face-to-face students and the lecturer. However, between the online students and the lecturer, there were some differences. For example about using the students' background information in the material. The online students did not think this would be very helpful to them, but the lecturer and the face-to-face students did think it would be motivating for students. Online RMME students did not think that role-plays would be motivating to them, but face-to-face students and the lecturer did think it would be motivating and practical. These differences were related to the fact that the online students thought that these recommendations were not helpful to them, because they could not go to the workshops.

For the OTE course, the OTE lecturer was saying that he liked a lot of recommendations, but he was wondering if students would use it. That is why he was a bit sceptical about some recommendations, especially because he already used some recommendations in his course, but no student had used the option. All the students and the lecturer agreed on the fact that interactive animations and a chat session would not be helpful for the OTE course. The students and the lecturer disagreed about using a live virtual classroom. The students thought it would be effective, efficient, interesting and motivating, usable and acceptable for online students, not for students who could go to the workshops. The lecturer did not like it very much, because technology was unreliable and it would take a lot of time for the lecturer and the students to prepare a live virtual classroom.

6.2 Conclusion

After the formative evaluation, all answers were analysed. The recommendations that got the approval of most of the students and the lecturer are presented in subsection 6.2.1. There were also recommendations in which the idea was good, but some keywords were missing, or some parts had to be removed or changed. So, some textual adjustments had to be made. These recommendations are presented in subsection 6.2.2. These two sections are the basis for the answer on research question 2 ‘How can the quality of the RMME and OTE courses of the LMEF Masters program be improved, by looking at the degree in which the courses can serve adults with several learning styles?’ and the underlying sub-question ‘Which of the characteristics of adult learning styles can be improved in the RMME and OTE courses?’. Finally this section ends in sub-section 6.2.3 with recommendations that did not get approval from the students or the lecturer and thus had to be removed. This chapter also answers the following underlying question:

6.2.1 Recommendations that can stay the same

The following recommendations are recommendations which *the students and the lecturers of the RMME and OTE courses* found effective, efficient, interesting and motivating, practical and usable and acceptable.

- Recommendations about interaction
- Recommendations about the interaction (teaching) methods:
 - It is advised to make use of online practice exercises
 - It is advised to make use of hyperlinks in an e-learning environment.
 - It is advised to make use of simulations, especially role-play and case studies
 - It is advised to make use of recorded lectures in an e-learning environment
 - It is advised to make use of classroom discussions
 - It is advised to make use of group-work
- Recommendations about assignments
 - It is advised that the written material is more explicit as to what steps need to be taken to complete the assignments.
 - It is advised that the lecturer submits extra information concerning the assignments on the discussion board, especially when in the face-to-face classroom sessions there have been several questions about the assignment.
- General recommendations
 - Course explanation
 - E-learning environment
 - Delivery environment
 - Access e-learning environment

The following recommendations are recommendations which the students and the lecturers of the RMME and OTE courses found effective, interesting and motivating, practical and usable and acceptable.

- Recommendations about the discussion board:
 - It is advised that the lecturer stimulates the students to use the discussion board
 - It is advised to structure the discussion board by lesson. Questions relevant for lesson 1, should be submitted under folder ‘lesson 1’. This way the students will not get ‘lost’ in the discussion board.
- Recommendations about the lessons:
 - It is advised to make use of a live virtual classroom (the lecturer of the OTE course did not find this recommendation really practical and usable).

The following recommendations are recommendations which *the students and the lecturer of the RMME course* found effective, efficient, interesting and motivating, practical and usable and acceptable.

- Recommendations about the interaction (teaching) methods:
 - It is advised to make us interactive animations and media
 - It is advised to make use of PowerPoint slides with pictures, graphics and diagrams
- Recommendations about feedback
 - It is advised to mark assignments within 3 weeks.
 - It is advised that the feedback is constructive.
 - It is advised that every student receives personalized feedback on their assignments.
 - It is advised that general feedback is submitted on the discussion board.
- Recommendations about the discussion board:
 - It is advised that all students and the lecturer receive an e-mail when something has been submitted on the discussion board

All the students and the lecturer thought this recommendation was efficient, effective, motivating, usable and acceptable. At this moment students can choose if they want to get an e-mail immediately or not. It is advised that students also have the opportunity to choose if they want to get an e-mail immediately or at the end of the day.
- Recommendation about the notice board
 - It is advised to keep the notice board up-to-date.
 - It is advised to submit the newest information on top of the notice board.

The following recommendations are recommendations which *the students and the lecturer of the OTE course* found effective, efficient, interesting and motivating, practical and usable and acceptable.

- General recommendations
 - Delivery of learning material

6.2.2 Recommendations that need to be adjusted

Some recommendations would be effective, efficient, interesting and motivating, practical and usable and acceptable to *the students and the lecturers of the RMME and OTE courses*, if some adjustments were made:

- Recommendation about interaction:
 - It is advised that the lecturer creates a place on the discussion board where students have to submit their personal background information (picture and approximately ten sentences).

The students found this recommendation effective, efficient, motivating, usable and acceptable. According to the lecturer, it would especially work at the beginning of the course. At the beginning of the course, students are more willing to do this. To make the recommendation more specific, it is adjusted as follows: *'It is advised that the lecturer makes at the beginning of the course a place on the discussion board where students have to submit their personal background information.'*

- Recommendation about the discussion board:
 - It is advised to structure the discussion board by lesson. Questions relevant for lesson 1 should be submitted under folder 'lesson 1'. This way the students will not get 'lost' in the discussion board.

The results of the formative evaluation showed that the majority of the students and the lecturer thought this recommendation would be efficient, effective, motivating, very usable and acceptable. The recommendation can be shortened by removing the last two sentences; they are an explanation, not the recommendation itself. So, the recommendation was adjusted as followed: *'It is advised to structure the discussion board by lesson.'*

- Recommendation about the notice board

The results of the formative evaluation showed that some students mentioned they would also like to receive an e-mail when something new has been submitted on the notice board. This is an important point, because this way the students get more motivated to use the notice board. That is why a recommendation is added to the recommendations about the notice board: *'If something new is submitted on the notice board, the students receive an email.'*

- Recommendation about writing a reflection paper

- It is advised that at the end of working in groups in the course, the students write a reflection paper of 2/3 pages about how the group-work went.

The results of the formative evaluation showed that the students and the lecturer mentioned the reflection paper should not be marked. Most students did not really like the idea of writing a reflection paper, because it will cost a lot of time. They did like the idea of reflecting on how the group-work was going. If students fill in a questionnaire halfway through working in groups in the course, they can change their behaviour and benefit more from group-work. Filling in a questionnaire takes less time than writing a reflection paper. So, the recommendation was adjusted into: *'It is advised that halfway through working in groups in the course, the students fill in a questionnaire about collaboration. This questionnaire is provided below.'*

- Recommendation about the delivery environment

- The students of the OTE course would like to have more face-to-face meetings, because then they can meet and interact with each other.

The results of the formative evaluation showed that this recommendation should be adjusted. The students prefer in general to have more face-to-face sessions and lesser online learning. The OTE students officially have no classroom sessions, but the OTE lecturer offers them in his own time. The OTE students want the course to be delivered with classroom sessions. That is why the recommendation was adjusted to: *'It is advised to have more face-to-face meetings for the OTE course.'*

Some recommendations would be effective, efficient, interesting and motivating, practical and usable and acceptable to *the students and the lecturers of the RMME course*, if some adjustments were made:

- Recommendation about feedback

- It is advised to answer e-mails or phone calls within 3 days.

All the students and the lecturer found this recommendation effective, efficient, motivating, usable and acceptable. The lecturer mentioned during the formative evaluation that 3 days should be 3 business days. To make the recommendation more specific it was adjusted into: *'It is advised to answer e-mails or phone calls within 3 business days.'*

Some recommendations would be effective, efficient, interesting and motivating, practical and usable and acceptable to *the students and the lecturers of the OTE course*, if some adjustments were made:

- Recommendation about the discussion board:

- It is advised that all students and the lecturer receive an e-mail when something has been submitted on the discussion board

All the students and the lecturer thought this recommendation was efficient, effective, motivating, usable and acceptable. At this moment students can choose if they want to get an e-mail immediately or not. It is advised that students also have the opportunity to choose if they want to get an e-mail immediately or at the end of the day.

6.2.3 The recommendation that needed to be removed

There was one recommendation that would not be effective, efficient, interesting and motivating, practical and usable and acceptable to *the students and the lecturers of the RMME and OTE courses*. That is why this recommendation needed to be removed:

- It is advised to make use of a chat session

The results of the formative evaluation showed that the students would not make use of chat sessions. If they wanted an immediate answer, they would phone that person. If it would be used in group-work, they would make an appointment so everybody was online. They preferred to use the phone, instead of a chat session. They would not use chat. The recommendation was not acceptable, effective, efficient or usable for the students. Because the students will not use it, this recommendation is removed.

There was one recommendation that would not be effective, efficient, interesting and motivating, practical and usable and acceptable to *the students and the lecturers of the OTE courses*. That is why this recommendation needed to be removed:

- Recommendations about the lessons:

- It is advised to make use of PowerPoint slides with pictures, graphics and diagrams

The results of the formative evaluation showed that the PowerPoint slides in the OTE course were good as it was; they were already effective, interesting and usable. So, they did not need more pictures, graphics and diagrams. That is why this recommendation was removed.

6.3 Overall conclusion

Research question 2 'How can the quality of the RMME and OTE courses of the LMEF Masters program be improved, by looking at the degree in which the courses can serve adults with several learning styles?' can be answered by implementing the recommendations that the students liked the most and by implementing the adjusted recommendations.

7 Implementation plan

After the results of the literature research (chapter 2), the evaluation phase (chapter 4 and 5) and the phase which leads towards recommendations (chapter 6) were combined, an implementation plan was written. The written implementation plan can be found in appendix 9. This implementation plan answers the main question of this project: 'How can the 'Research Methods in a Multidisciplinary Environment' (RMME) and 'Operational Test and Evaluation' (OTE) courses of the LMEF Masters program ensure best teaching practice, so that several adult learning styles are addressed?'

In this chapter a justification of the recommendations in the implementation plan will be given. In this justification an overview of the recommendations in the implementation plan will be given. The extended version of the recommendations can be found in appendix 9. The recommendations are related to the use of learning styles in adult learning. The recommendations are also related to the research project of Klink (2006). In section 7.1 the structure of the implementation plan will be given. In section 7.2 justifications about the recommendations related to interaction will be given. In section 7.3 justifications about the recommendations related to the interaction (teaching) methods will be given. After that, justifications about the recommendations related to feedback (section 7.4), assignments (section 7.5) and general recommendations (section 7.6) will be given.

Unless mentioned else, the recommendations are for both courses.

7.1 Structure implementation plan

The implementation plan is structured as follows:

- Introduction
- Recommendations
- Planning
- Costs
- Risks

It is important to have a chapter about the planning in an implementation plan, because it is important that it is clear for the lecturers to see which recommendations will take more time than other recommendations to implement. By providing a planning, lecturers know when to start implement the suggested recommendations. The planning is provided in three levels: a long term planning, a short term planning and a planning while the course is running. Each planning is provided in a table. The table consists of three columns. One column contains the suggested recommendation, one column contains an explanation of the recommendation, why it needs this planning. The last column shows who is responsible for taking care of the suggested recommendation and for making sure that the recommendation will succeed.

It is also important to have a chapter about the costs in an implementation plan, because for a good implementation of the implementation plan the lecturers need to have insight into the linked costs and required staff commitments. This way they can see what the costs are. A distinction is made between non-recurrent costs and structural costs.

Next to a chapter about the planning and the costs, it is also important to have a chapter about the risks in an implementation plan, because the lecturers can then see which factors will

make the implementation plan succeed, and which factors will make the implementation plan fail.

There was chosen for this structure on basis of other implementation plans. This structure was also used in other implementation plans and is very useful, as explained.

The second chapter of the implementation plan consists of the recommendations. The implementation plan consist of a lot of recommendations. Because of this, the implementation plan is extended. The lecturers can use the plan individually. Every step that is advised to take, is explained in the implementation plan. Below the justifications of these recommendations will be given. They are only explained in short in this section, because otherwise it would be too much. The whole implementation plan can be found in appendix 9.

7.2 Recommendations with respect to interaction

This section will discuss three recommendations about improving interaction between the students and between the students and the lecturer of the RMME and OTE course.

Results evaluation phase and the phase towards recommendations

From the analysis of the evaluation phase and the phase towards recommendations, it was clear that for the online students there were not enough possibilities to interact with other students. Online students also missed interaction with the lecturer. This way the online students did not get the guidance they preferred to have. Another result was that students did not feel comfortable with learning, because students did not know each other and they did not know the other students with whom they were working in the groups. The lecturer also did not know the personal backgrounds of the students.

As a result of this, it is advised to use the following recommendations to improve the interaction:

Recommendations

a) It is advised that the lecturer creates a place on the discussion board where students have to submit in short their personal background information.

The personal background information consists of:

- a picture of themselves;
- information about their work situation at this moment;
- their work history;
- their educational background; and
- a short description of their personal life situation, like if they are married, have kids and their hobby's.

In total this information should not be more then a half A4-page.

It is advised to submit this background information in a separate folder on the discussion board (one can read more about using a folder structure in the discussion board paragraph further on in this document). The lecturer should encourage all students to submit this, he should make it compulsory. It is up to the students to read the background information of other students, it is not compulsory. The students, who would like to do this, have the possibility now.

The lecturer can stimulate the students to make more and better use of the discussion board, by making it clear to them at the beginning of the course that they can improve their grade by

participating active on the discussion board. When they submit their background information and a picture of themselves on the discussion board, this will be 1% of their grade. By giving the students a grade for their participation they are more willing and motivated to do it.

b) It is advised that the lecturer calls the online students at least one time during the course.

This way the online students have real-human interaction, they can ask questions and get instant feedback. This motivates them.

c) It is advised that the lecturer uses the students' background information in the material, so that especially the online students can relate to it.

This is something that the online students are lacking right now. The students' background information can be used in the material, by using examples in the lessons that are related to this background or by using for example case studies that are related to the students' background.

The lecturer can stimulate the students to make more and better use of the discussion board, by making it clear to them at the beginning of the course that they can improve their grade by participating active on the discussion board. When they submit their background information and a picture of themselves on the discussion board, this will be 1% of their grade. By giving the students a grade for their participation they are more willing and motivated to do it.

7.3 Recommendations with respect to interaction (teaching) methods

This section will discuss eleven interaction (teaching) methods that will help improve the RMME and OTE course.

According to the students of the RMME course there was not a lot of variation in the way the lecturer presented the content in the face-to-face classroom session and the e-learning environment (blended learning environment). The blended learning environment mainly made use of PowerPoint lectures. Only PowerPoint lectures in the e-learning environment were not motivating. The instructional materials and aids used (transparencies, manuals, videotapes, and the like) were not enhancing the students' learning process. The lecturer did not present the lesson in steps that the students could follow. Because there was not enough variation in interaction methods used, the lecturer did not hold the students' interest.

In the RMME course the same can be said for having a whole day of lectures during the face-to-face classroom sessions. The overall RMME course did not contribute to the online students' knowledge and/or basic skill base.

The lecturer and the students preferred the use of all human interactions (students-teacher interaction, students-students interaction, students-guest interaction) and non-human interactions (students-content interaction and students-environment interaction).

It is recommended to adequately assist the students in learning the material, by meeting the different learning styles of the students.

To meet the different learning style needs of the students, the lecturer has to do something with the preferences of the students:

- The students prefer to read information.
- The students prefer working with graphics or diagrams to represent information.
- The students prefer physical, 'hands-on' activity.

- The students prefer working with others.
- The students prefer reflection.
- The face-to-face students prefer to hear material being presented.

As Sternberg was saying (1997, p. 115, In Brennan, McFadden & Law, 2001) ‘The key principle is that in order for students to benefit maximally from instruction and assessment, at least some of each should match their styles of thinking. Different methods of instruction work best for different styles of thought.’

Regardless of which approach or theoretical framework an instructor takes in the issue of learning style, the key is to recognize that differences exist and must be accounted for somehow in an (online) class (Palloff & Pratt, 2003; Moran, 1997). A ‘one size fits all’ approach will not work. It is a mistake to assume that every (online) student looks and feels the same. That is why the following suggested interaction methods should not be obligatory, but it is advised that they are available. So, the students who want to do them have the possibility. O’Connor (1997, In Palloff & Pratt, 2003) notes that technology actually increases the range of activities that an instructor can use to address varying learning styles.

Meeting the different learning styles of the students can be done in different ways. The students will be able to obtain the same information by means of several formats and manners and the student will be able to get an answer to questions that are important for him/her, independently of time, location, place and learning style preferences. These different ways will be discussed in subsection 7.2.1 until subsection 7.2.11.

7.3.1 Discussion board in an e-learning environment

Results evaluation phase and the phase towards recommendations

From the analysis of the evaluation phase and the phase towards recommendations, it was clear that the discussion board was not used very much, but the students and the lecturer preferred the use of a discussion board.

According to the literature, a discussion board is also very important, because it can be used for ‘asynchronous’ communication between lecturers and students. Online discussion provides an ‘anywhere, anytime’ learning environment which facilitates communication (University of South Australia, 2005).

The students, the lecturer and the literature results all found the use of a discussion board important. Also the point about responding after a couple of days to the answers given by the students is still advised to do. The lecturer thought this recommendation was not efficient, because it would probably cost him much extra time. It is still advised to respond after a couple of days to answers given by the students, because for the students it is very important that the lecturer responds to given answers. As a result of this, it is advised to use the following recommendations to improve the use of the discussion board:

Recommendations

- a) *It is advised that the lecturer stimulates the students more to use the discussion board:*
- *Submitting general feedback on the discussion board.*
 - *Submitting relevant questions asked by one student on the discussion board.*
 - *When a student places a question on the discussion board, it is advised that the lecturer also gives the other students opportunities to answer that question. This way the lecturer lets the students think for them selves.*

- ***It is advised that the lecturer responds after a couple of days (for example at the end of the week) to the answers given by the student.***

When relevant questions asked by one student are submitted on the discussion board, all the students can read the question and the answer given to it. Especially for online students who cannot go to the face-to-face meetings this can be very helpful.

When the lecturer also gives the other students opportunities to answer a question, the lecturer lets the students think for them selves, and not give them all answers straight away without letting them think about the subject.

The lecturer should respond to the answers given by the students, because this way the students know what answers are good and what not.

The lecturer can stimulate the students to make more and better use of the discussion board, by making it clear to them at the beginning of the course that they can improve their grade by participating active on the discussion board. When they submit good and relevant questions and also give good comments on other questions, this will be 2% of their grade. By giving the students a grade for their participation they are more willing and motivated to do it.

b) It is advised to structure the discussion board by lesson.

Questions relevant for lesson 1 should be submitted under folder 'lesson 1'. This way the students will not get 'lost' in the discussion board. They can go directly to the lesson in which they have a question, or for which they want to read an answer. They do not have to read a lot of pages with other questions first.

It is also advised to make the structure in such a way that when a reaction to a question is submitted, this reaction is put under the question. This way it is clear what the questions are and what the reactions to this answer are.

This recommendation is not available yet, but it is possible for the Flexible Learning Centre to do this. The Flexible Learning Centre is located at the Mawson Lake campus of the UniSA. Lecturers do have the possibility to make several discussion boards and name every discussion board differently. So one discussion board can be named 'Background information', one discussion board can be named 'Lesson 1', etc. The lecturers have the possibility to give the students a 'read only' or 'write' permission. The lecturers can also make the several discussion boards active or non-active. This way the students cannot submit questions to the wrong lessons.

c) It is advised that all students and the lecturer receive an e-mail when something has been submitted on the discussion board.

Because some students preferred to have an e-mail immediately when something is submitted, and other students would like to get it at the end of the day, they should get the opportunity to choose for themselves. At this moment students can choose if they want to get an e-mail immediately or not. It is advised that students also have the opportunity to choose if they want to get an e-mail immediately or at the end of the day. This e-mail would say: 'There are five new messages on the discussion board about 'this' and 'this' topic.' This possibility is not available right now, but it can be. This has to be spoken through with Flexible Learning Connection. They can change things in the courses' website.

7.3.2 Notice board in an e-learning environment

Results evaluation phase and the phase towards recommendations of the RMME course

The analysis of the evaluation phase and the phase towards recommendations showed that the notice board was not up-to-date. The students and the lecturer found the notice board very helpful. They can have a quick look on the notice board if there are updates and/or reminders. It reminds them of what is coming. This will stimulate them.

The students, the lecturer and the literature results all found the use of a notice board important. As a result of above, it is advised to use the following recommendations to improve the use of the notice board:

Recommendations for the RMME course

a) It is advised to keep the notice board up-to-date.

To make sure the notice board is used effectively, it is advised that the lecturer submits information at least once a week. The information put on the notice board can be reminders about assignments, new things that are submitted on the website, changes on the website, etc. It becomes then a weekly routine to look at the notice board. This way the lecturer will not forget to submit important information, and the students will not forget to look at the notice board.

b) It is advised that, when something new is submitted on the notice board, the students receive an email.

This means the students look at the notice board on time. This is possible if the lecturer makes out of a notice board a discussion board. He has to take the same steps as creating a discussion board; he only names it then 'notice board'.

c) It is advised to submit the newest information on top of the notice board.

This way the students do not have to scroll down to read the new information. This will save time and is more motivating.

7.3.3 Online practice exercises

Results evaluation phase and the phase towards recommendations

From the results of the evaluation phase and the phase towards recommendations it was clear that the courses did not make use of online practice exercises, but the lecturer and the students preferred the use of online practice exercises.

Research has shown that practice of what is being taught moves skills and knowledge from short-term to long-term memory (Driscoll & Carliner, 2005). This way the use of online practice exercises is very important.

The students, the lecturer and the literature results all found the use of online practice exercises important. As a result of this, it is advised to make use of online practice exercises.

Recommendation

a) It is advised to make use of online practice exercises

7.3.4 Hyperlinks

Results evaluation phase and the phase towards recommendations

The analysis of the evaluation phase and the phase towards recommendations showed that the lecturer and the students preferred the use of hyperlinks in an e-learning environment. The

lecturer and the students mentioned that there should not be too many hyperlinks. The usability of hyperlinks will then drop, because the students get lost. McVay Lynch (2004) mentions that an inexpensive method to enable the student to interact with the content is to provide hyperlinks. By using a hyperlink, an image or piece of text can link to another website.

The students, the lecturer and the literature results all found the use of hyperlinks important. As a result of this, it is advised to make use of hyperlinks, but not too many.

Recommendation

a) It is advised to make use of hyperlinks in an e-learning environment.

7.3.5 Interactive animations and media

Results evaluation phase and the phase towards recommendations of the RMME course

The analysis of the evaluation phase and the phase towards recommendations showed that the lecturer and the students thought interactive animations could be useful.

The use of animated segments and/or video clips to show a process is a powerful interactive method. A highly instructive method for teaching procedures is allowing the student to play, replay, or slow down the playback of a process captured on video or illustrated in an animation (Driscoll & Carliner, 2005).

The students, the lecturer and the literature results all found the use of interactive animations and media important. For the lecturer of the RMME course it can be difficult to develop interactive animations by himself, because of the time limitations and he has not got the right knowledge. There are different possibilities to develop the interactive animations; these different possibilities are shown in the implementation plan, see appendix 5. As a result of this, it is advised to make use of interactive animations and media.

Recommendation for the RMME course

a) It is advised to make use of interactive animations and media.

7.3.6 Simulations: Role-play & Case-study

Results evaluation phase and the phase towards recommendations

From the analysis of the evaluation phase, it was clear that the courses did not make use of role-play and case studies. The results of the evaluation phase and the phase towards recommendations showed that the lecturer and the students preferred simulations, especially role-play and case studies.

Role-play

According to the literature results, role-play simulation is a learning strategy in which the learners assume the roles of fictional characters in a defined scenario. Role-play strategies are one of the less expensive simulation options because the program can be run in a live virtual classroom environment. This can be done via text in the form of e-mail, instant messaging, or threaded discussions, and in a traditional face-to-face session. Role-plays take advantage of adult learners' life experiences. The students are able to try out different problem-solving strategies in a safe environment. Learners can be asked to do things such as take a point of

view contrary to their beliefs and thus to explore a different point of view. Learners are also able to try approaches and reflect on the outcomes (Driscoll & Carliner, 2005).

Case-study

A case study is a presentation, in narrative form, of an actual event that has occurred inside an organization (Driscoll & Carliner, 2005; Palloff & Pratt, 2005). They are not prescriptive, nor are they used to prove a point; they are designed to develop critical analysis and decision-making skills. Case studies should be used when the goal is to enable participants to: (1) apply previously learned theories to the circumstances in the case, (2) decide what is pertinent, (3) identify the real issues, (4) decide what should have been done, and (5) develop a plan of action (Driscoll & Carliner, 2005).

The students, the lecturer and the literature results all found the use of role-play and case studies important. As a result of this, it is advised to make use of role-play and case studies.

Recommendation

a) It is advised to make use of simulations, especially role-play and case studies.

7.3.7 Recorded lectures

Results evaluation phase and the phase towards recommendations

From the analysis of the evaluation phase, it was clear that the course did not make use of recorded lectures. The results of evaluation phase and the phase towards recommendations showed that the lecturer and the students preferred recorded lectures in an e-learning environment.

The OTE lecturer preferred recorded lectures that are embedded in a PowerPoint slide.

From the literature research it was made clear that recorded programs are becoming a common form. A popular method is the use of a live virtual classroom. Live virtual classroom programs can be recorded and then made available for viewing as recorded lectures. It is like watching a video of a live traditional classroom program (Driscoll & Carliner, 2005).

As a result of above, it is advised to make use of recorded lectures. The students, the lecturer and the literature results all found the use of recorded lectures important.

Recommendation

a) It is advised to make use of recorded lectures in an e-learning environment.

7.3.8 Live virtual classroom

Results evaluation phase and the phase towards recommendations of the RMME course

From the results of the evaluation phase, it was clear that the course did not make use of live virtual classrooms. The results of the evaluation phase and the phase towards recommendations showed that the lecturer and the online students preferred the use of a live virtual classroom, because it would improve the e-learning environment. The lecturer mentioned that it will be useful to make use of a live virtual classroom two times in the course, especially for the online students. It will be too time-consuming and expensive to use it much more.

Results evaluation phase and the phase towards recommendations of the OTE course

From the results of the evaluation phase, it was clear that the course did not make use of live virtual classrooms. The results of the evaluation phase and the phase towards recommendations showed that the students preferred the use of a live virtual classroom. According to them it would especially be useful for the online students. The lecturer did not like live virtual classrooms, because of the unreliable technology and because it takes a lot of time to prepare and to use a live virtual classroom.

Live virtual classes take place in real time. The virtual classroom is an online learning experience in which the instructor and students work together in real time. Working together, the instructor and students have live audio dialogue while sharing slides, viewing a software application, surfing the Internet, working in virtual rooms, asking questions and making assessments (Driscoll & Carliner, 2005). They also call this video-conferencing. It allows the student to see the instructor and the classmates and talk to them while sitting at his (home) computer. Many desktop videoconferencing products have been introduced that have the ability to project an image of the person who was called onto a small window on the computer screen (McVay Lynch, 2004).

There are three reasons, according to the literature, to make use of a live virtual classroom. The first reason is that the content is faster and less expensive to develop than self-paced instruction. A second reason to use live virtual classroom programs is that they can provide group learning without the travel and expense of traditional classroom programs. The last reason to make use of a live virtual classroom program is that many of these programs offer the option of recording a session and editing it for later viewing (Driscoll & Carliner, 2005)

The students, the lecturer of the RMME course and the literature results all found a recommendation about the use of a live virtual classroom important. The lecturer of the OTE course did not like the use of a live virtual classroom. It is still advised to make use of a live virtual classroom for at least two sessions, because for the online students the use of a live virtual classroom is very important. They miss the live interaction and live questioning. For them it is not possible to attend to the classroom session, so to use of the live virtual classroom for at least two times is a good alternative. As a result of this, it is advised to make use of a live virtual classroom.

Recommendation

a) It is advised to make use of a live virtual classroom.

7.3.9 PowerPoint slides with pictures, graphics and diagrams

Results evaluation phase and the phase towards recommendations of the RMME course

The results of the evaluation phase and the phase towards recommendations showed that more pictures, graphics and diagrams would help students understand the content better. This way the lessons would fit better with several learning styles.

According to Driscoll & Carliner (2005) visuals can enhance the (online) learning experience in several ways, from putting a human face on an otherwise anonymous learning experience to more efficiently and effectively communicating technical content than is possible with words alone. Visuals are essential to learning, because according to Stolovitch (2004, In Driscoll & Carliner, 2005) 83% of what is learned is learned through sight. Only 11% of what is learned is learned through hearing.

The students, the lecturer of the RMME course and the literature results all found the use of PowerPoint slides with pictures, graphics and diagrams important. As a result of this, it is advised to make use of PowerPoint slides with pictures, graphics and diagrams.

Recommendation

a) It is advised to make use of PowerPoint slides with pictures, graphics and diagrams.

7.3.10 Classroom Discussions

Results evaluation phase and the phase towards recommendations

The results of the evaluation phase and the phase towards recommendations showed that the students and the lecturer preferred the use of classroom discussion.

Barton, Heilker & Rutkowski (2005) are saying that classroom discussions function best when students are talking to students. The goal is to get as many students involved in talking to one another as possible and for the teacher to fade into the background. Students are well practiced in how to talk to and listen to teachers, and in how to address and look to authority figures for answers. But they are not well versed in how to talk to and listen to each other, in how to navigate and negotiate and discuss issues of serious consequence and work toward answers among equals.

Classroom discussions provide an opportunity for students to discuss open-ended topics, to say an opinion, to be heard, to respond thoughtfully to the ideas of others, and to solve problems through thoughtful discussion. Classroom discussions differ from normal conversations. They have a specific form and they usually have a specific goal, such as the development of communication skills, or to encourage thinking/debating skills. Although class discussions have a specific form they are not formal meetings. Class discussions do not have a chairperson or a secretary, and they also do not have an agenda or minutes (Dempster & Raff, 1992).

Students learn through discussions to explore subjects/matters and to deal with people of different backgrounds (Dreikers, Grumwald & Pepper, 1971, In Dempster & Raff, 1992).

The students, the lecturer and the literature results all found the use of classroom discussions important. As a result of this, it is advised to make use of classroom discussions.

Recommendation

a) It is advised to make use of classroom discussions.

7.3.11 Group-work

Results evaluation phase and the phase towards recommendations

The results of the evaluation phase showed that group-work was not working effectively. The students found it difficult and the discussions did not contribute to their learning process. From the results of the evaluation phase and the phase towards recommendations, it was clear that the students did prefer working with other students.

Group-work has several benefits like (Turoff, Discenza & Howard, 2005):

- Due to social pressures, students tend to be more concerned with how other students view their work quality than how the lecturer views it. They are significantly more motivated to participate in a meaningful way when their fellow students can view their contributions.
- When equality of communications is encouraged, students cannot get away with being passive or lazy. The transcript or electronic recording of the discussions on the discussion board shows who is and who is not participating. It is visible to both the lecturer and other students that someone is being lazy.
- It becomes more noticeable what the outstanding students learn.
- The performance of students at the lower end of the distribution is improved. The communication systems permit them to catch up, because they are able to obtain a better understanding of the material with which they are most uncomfortable or have the least background knowledge.

The students, the lecturer and the literature results all found the use of group-work important. As a result of this, it is advised to use the following recommendations to improve the use of group-work:

Recommendations

a) It is advised that at the beginning of each course some time is spent on how to work effectively in groups.

The students should encourage and stimulate each other in the group to have meaningful discussion. The atmosphere should be one in which the students want to learn from each other and share experiences, not to keep everything for themselves. Students should be made aware of the fact they are expected to have a pro-active attitude and contact each other to discuss topics. They should not wait until the lecturer tells them.

Group-work can be a key factor in making distance courses as good as or better than face-to-face courses (Hiltz & Wellman, 1997, In Turoff et al., 2004).

b) It is advised to submit a document in the e-learning environment of how to work effectively in groups.

Every student should have access to this document. To make sure every student reads this, the lecturer can say in the meetings and write on the website in the schedule 'To improve your grade – download these papers and read them.' This gives the students a reason to read the documents.

c) It is advised that the lecturer stimulates group-work, by showing interest in how the group-work is progressing.

During the meetings the lecturer can walk to each group and ask how the group-work is going, if there are any problems. When working on the tutorials and for the online students, the lecturer can call up different members of the groups and ask them how the group-work is going. By calling up different members in a group, and not always the same person, the lecturer gets a good idea how the group-work is really going.

d) It is advised that halfway through working in groups in the course, the students fill in a questionnaire about collaboration.

When using this questionnaire, students have to think about how the group-work is going and what their own role is in the process. When necessary they can change things for the rest of the course to make the group-work, work better.

The inclusion of reflection on the application of the collaborative group-work in a (online) class can help to develop skills students need to lead or function in a virtual team in the work

environment (Palloff & Pratt, 2005). Reflection can promote the further development of one's skills or individuality. Mathews and Sayers (1997, In Vos & Vlas, 2000) say: "If you always do what you have always done, you will always get what you always got". Without reflection, without looking back at your own actions (experiences, activities), ideas (knowledge, insights) or attitude (emotions, feelings), no-one gets easy sight at and insight in his own possibilities, and without that no-one can develop his/her competences further, in the sense of: completing, improving, replacing, fitting or combining with other operations, ideas and attitudes (Vos & Vlas, 2000).

The lecturer can stimulate the students to reflect on the group-work, by making it clear to them at the beginning of the course that they can improve their grade by participating active in group-work and when they fill in the collaboration questionnaire. When they submit a filled in questionnaire in which it is clear that they have really done their best to reflect on how the group-work is going, this will be 2% of their grade. By giving the students a grade for filling in the collaboration questionnaire, they are more willing and motivated to do it. It is recommended that the collaboration questionnaire will not be marked, but that it is compulsory. The Collaboration questionnaire should be printed on one A4, with a front and a backside.

7.4 Recommendations with respect to feedback

This section will discuss recommendations about improving feedback for the RMME course.

Results of the evaluation phase of the phase towards recommendations of the RMME course

From the results of the evaluation phase, it was clear that feedback on assignments was not always timely. Students did not always receive personalized feedback from the lecturer. The overall course did not contribute to the online students' knowledge and/or basic skill base. From the results of the evaluation phase and the phase towards recommendations it can be concluded that the students and the lecturer found feedback in the right way and at the right time really important.

For students it is important that they get a mark back on their work, as soon as possible. Otherwise the effect of the feedback is gone (Desimone, Werner & Harris, 2002). Students need to know how they did it. This keeps them motivated (Desimone et al, 2002). Students also need to know what they did well and why it is good (Palloff & Pratt, 2005). So, the feedback needs to be informational (Desimone et al., 2002). According to Van Dellen (2001, In Kessels & Poell, 2001) good feedback promotes effective learning.

The students, the lecturer and the literature results all found feedback important. As a result of this, it is advised to use the following recommendations to improve feedback:

Recommendations for the RMME course

a) It is advised to answer e-mails or phone calls within 3 business days.

This way the lecturer has enough time to think about the question. The lecturer can also be very busy when he gets the e-mail or phone call, but it should be possible to answer them within 3 days. For students, 3 business days is not too long. If it takes more than 3 days, students can get de-motivated and not want to finish the assignment on time.

b) It is advised to mark assignments within 3 weeks.

Lecturers can be very busy with other things, but they made the schedule of the course, so they know when students deliver something that has to be marked. Marking can take a lot of time, but 3 weeks should be enough. If they do not get a mark back, or only after 2 months, then students do not know what they have submitted and it is not really relevant for them anymore.

c) It is advised that the feedback is constructive.

Feedback should not only be negative, students need to know what can be improved. Here, it is also important that they need to know how it can be improved.

d) It is advised that every student receives personalized feedback on their assignments.

This is important, so students know where they are in their learning process. When they only get general feedback, they cannot do that.

e) It is advised that general feedback is submitted on the discussion board.

This way all students can read it. This is important, because if general feedback is told in class, then the online students and the students who could not attend the meeting did not hear it. When students start working in the next assignment they can read the general feedback again and keep that in mind while they are working on the assignment.

7.5 Recommendations with respect to the assignments

This section will discuss recommendations about improving the assignments for the RMME and OTE course.

Results evaluation phase and the phase towards recommendations

The results of the evaluation phase showed that it is not clear for the students what was expected from the assignments. From the results of the evaluation phase and the phase towards recommendations it can be concluded that the students and the lecturer found it important that assignments are clear and explicit.

As a result of above, it is advised to use the following recommendations to improve the assignments:

Recommendations

a) It is advised that the written material is more explicit as to what steps need to be taken to complete the assignments.

This way the online students know better what steps they need to complete to finish the assignment. Palloff and Pratt (2005) suggest that when a lecturer submits the question ‘Is everyone clear about the assignment task?’ on the discussion board, this will free the students up to ask questions that they might otherwise be embarrassed to ask. In this way, bad assignments submitted by students can be prevented.

b) It is advised that the lecturer submits extra information concerning the assignments on the discussion board.

This recommendation is especially important when in the face-to-face classroom sessions there have been several questions about the assignment, or when he receives e-mails or phone

calls with the same questions in it. If the lecturer submits this information on the discussion board, it can be accessed by all students and especially for the online students this is useful.

7.6 General recommendations

In this section five general recommendations are discussed, that are usable in both the RMME and OTE course, but usable in other courses as well.

7.6.1 Course explanation

Results evaluation phase and the phase towards recommendations

The results of the evaluation phase and the phase towards recommendations showed that it was not clear for the students what they should expect of the course, before the course started. Because of this, it is advised to use the following recommendation to make it for the students clearer what they can expect of the course:

Recommendation

a) It is advised to submit more detailed course information on the universities website.

Students have a look at the universities website to find out more about the course. This information helps them make a decision of what courses they wish to enrol. Especially for elective courses this is important. But for compulsory courses it is also important that students know what to expect. This way, students can make a better decision.

Information on the universities website should contain:

- Aims and objectives of the course;
- List of lessons and the topics that are going to be discussed in those lessons;
- How many face-to-face meetings there are;
- How many assignments there are in this course;
- A short description of the assignments; and
- The amount of group-work and individual work.

7.6.2 Course website (e-learning environment)

Results evaluation phase and the phase towards recommendations

From the results of the evaluation phase, it was clear that the buttons of the website for each course were not in the same order. The course outlines did not use the same format and this can be confusing for the students. From the results of the evaluation phase and the phase towards recommendations, it can be concluded that the students and the lecturer thought it was important that every course puts the buttons in the same order and that every course uses the same format.

As a result of this, it is advised to use the following recommendations to improve the course website:

Recommendations

a) It is advised to put the buttons in the same order.

b) It is advised to use the same format for the course outline.

7.6.3 Delivery environment

Results evaluation phase and the phase towards recommendations

The results of the evaluation phase and the phase towards recommendations showed that the students and the OTE lecturer preferred a blended learning environment. The RMME lecturer did not prefer a blended learning environment; he preferred a synchronous face-to-face delivery environment. This is not possible, because there are also students who follow the course only online. Blended learning is than a good alternative.

As a result of this, it is advised to use the following recommendation:

Recommendation

a) It is advised to have more face-to-face meetings for the OTE course.

Students can meet and interact with each other in face-to-face meetings. They think that is very important. Now the OTE course is offered as an online course, but students would really like to have face-to-face meetings. The OTE lecturer offered a couple of workshops in his own time, this is really helping the students; they would like to have them even more.

7.6.4 Access e-learning environment

Results evaluation phase and the phase towards recommendations

The results of the evaluation phases showed that some students have problems with log-in. From the results of the evaluation phase and the phase towards recommendations it can be concluded that the students and the lecturer found it important that students know who they can contact if that happens. Because of this, it is advised to use the following recommendation to improve the access of the e-learning environment:

Recommendation

a) It is advised that the lecturer sends all the students an e-mail at the beginning of the course to check if the students can log-in and if they have problems with this, who they can contact. Students should all respond to this e-mail.

This way the lecturer knows if the students can log-in, and can offer them help if they cannot do this. If students have problems with log-in during the course, they know who they can contact and do not have to spend a lot of time searching in the universities website for a contact person.

7.6.5 Delivery of learning material

Results evaluation phase and the phase towards recommendations

From the results of the evaluation phase, it was clear that the lecture notes/resources get delivered a week before the lessons. According to the students, that was too late. From the results of the phase towards recommendations, it can also be concluded that the students and the lecturer thought it could be helpful for the students when material is delivered two lessons ahead. As a result of this, it is advised to use the following recommendation to improve the delivery of the learning material.

Recommendation

a) It is advised to deliver the learning material two lessons ahead.

This way the students can schedule their studies better into their work schedule, but cannot work too far ahead.

8 Discussion

In the previous chapter, chapter 7, the main question was answered by presenting an implementation plan with which the quality of the RMME and OTE courses can be improved. In this last chapter, the limitations of this research project will be brought forward. It is however just as important to also formulate the value of the results explicitly. This chapter will discuss strong and weak points of the used methods and the results. The section 8.3, contains a number of recommendations for follow-up studies. The last section, section 8.4 will look back on the main question of this research project.

8.1 Discussion research methods

In this section the validity of the research methods used will be discussed.

8.1.1 Validity

The sample size of the interviews was small. Because each course had one lecturer, the information they gave could not be compared. This could be a threat to the validity, because one can not be sure that the information retrieved from these interviews is reliable. Also for each course; four students were interviewed. The selected students were not randomly selected, because the response rate was low. Every student volunteering to be interviewed, had to be included in the sample. As a result of this there may be a selection bias; causing a low internal validity (Slavin, 1992).

For the formative evaluation the same students were interviewed as during the interviews in the evaluation phase to answer research question one. To improve the internal validity, the recommendations were sent to all the students, with the request to respond to it within 3 weeks. Even after sending a reminder, only two students of the RMME course and one student of the OTE course responded. One cannot speculate what the students who did not respond would say about the suggested recommendations.

After the 3 weeks had passed, two more responses were received. These late responses conformed closely with those included in the analysis. Because of the timeframe, the researchers had moved on to the next phase in their project and did no longer take this data into consideration.

It is possible that during the weeks in which the interviews were conducted, the students were very busy at their work or in their personal life situation. If they also had to do a lot of work for the course, it is possible that they were more negative about the course than when they were not busy at work or in their personal life situation. This could be a threat to the internal validity, caused by history (Slavin, 1992).

In the AITEC questionnaire of 2003 and 2004 only percentages could be calculated of the results, because no individual answer were available. Because this was lacking, there was no insight in the ceiling or floor effects. So the extreme answers were unknown. Because of this, instrumentation is a third threat to the internal validity (Slavin, 1992). This internal validity threat was diminished, because the individual responses to the open questions of the questionnaire were available. These responses were taken for further analysis in this research project.

8.2 Discussion results

In the discussion of the results of both research questions the strong and weak points are taken into consideration. In subsection 8.2.1 the reliability/validity of the results will be discussed. In subsection 8.2.2 the implementation of the recommendations will be discussed.

8.2.1 Reliability / Validity

With only eight interviews, of course the question rises: How complete and relevant are the results? For every course there were online and face-to-face students. In the responses of the RMME and OTE students given on the developed questionnaire, there were differences between the responses of the face-to-face students and the online students. Most of the answers given on the interviews were the same. There was however, only one online student interviewed for the RMME course and three face-to-face students. For the OTE course, there were two online students and two face-to-face students. This small sample size is a concern for the reliability and of the external validity, because there can be spoken of nonrepresentativeness (Slavin, 1992).

The results of the developed questionnaire and the first round of interviews corresponded with each other, there were no big differences. There were face-to-face and online students who responded and filled in the questionnaire.

One cannot be sure that the results obtained will be applicable to students who will take the course in the future. The suggested recommendations were based upon the preferences of the students of this semester. Not all preferences of the students and lecturers could be carried out, because some wishes were a threat to the validity of the recommendations. Future students may have other preferences, related to the use of interaction methods and learning styles. This research was based upon the preferences of the students of this year. However, the recommendations were written in such a manner that most interaction methods and all learning styles are covered and generally applicable to future students.

The suggested recommendations require a lot of time and energy from the lecturers. Although the lecturers were really enthusiastic about the recommendations in the formative evaluation, it is possible that they react toward the researchers like the Hawthorne effect (Slavin, 1992). This can be a threat to the external validity. The lecturers may react positive and say that they are willing to improve their course by using the suggested recommendations just because they want to look good in front of the researchers. If the lecturers are busy with other things and the course is coming up, it cannot be said for certain that the lecturers are going to use all the suggested recommendations. The Hawthorne effect might also play a role in the interviews with the students. However, since the results of the other activities did correspond with the results of the interviews of the students. That is why it is not likely that the Hawthorne effect plays a role in this research project.

During the interviews, it is possible that the interviewer would like to hear only what fits with the research project. Therefore it is possible that he influences the student or the lecturer to say specific conforming things. Also when analysing the results of the interviews, it is possible that the interviewer interpreted answers in a different manner than intended by the student. To make sure all answers were interpreted correct, the researchers did a member check in which the results of the interviews were sent to all students and the lecturers, asking if the answers were interpreted correctly. According to Russell & Gregory (2003) member checking was done to inquire whether participants' viewpoints were realistically interpreted, to determine whether there are errors of fact.

By sending the other students of the two courses the recommendations, to get additional information, misinterpretation could have been prevented in the formative evaluation. Since few responses were received, this possibility cannot be completely ignored.

8.2.2 Implementation of the recommendations

Besides the reliability and validity of a research project, a bearing surface with the lecturers is also very important, because they are the ones who have to use and work with the recommendations. When it is assured that during the complete process the people are involved, then the chance for successful implementation is enhanced. In this research project a bearing surface with the lecturers was accomplished by several aspects:

In this research project lecturers were involved from the beginning of the course until writing the recommendations. At the beginning of the course the researchers introduced themselves in the staff meetings and told what they were going to investigate. Also, the lecturers got an e-mail with the request to participate in an interview. In this e-mail the topics for the interview were explained. The lecturers were really involved in the research project; they were interviewed twice. In these interviews they were asked what they would like to see improved and if they had further suggestions. The lecturers could see what happened to the information they gave the first time during the second interview. At the end of the research project, the implementation plan was discussed thoroughly with them, to make sure they understood the implementation plan and knew how to use it.

The recommendations could not be implemented and the actual changes could not be evaluated in this short timeframe of this research project. So it cannot be analysed if the recommendations really improve the quality of the RMME and OTE courses of the LMEF Masters program, by looking at the degree in which the courses can serve adults with several learning styles. Because this was not possible, there was chosen to discuss the recommendations with students and the lecturers of the RMME and OTE course. They were asked if they thought the given recommendations would improve the quality of the RMME and OTE courses of the LMEF Masters, by looking at the degree in which the courses can serve adults with several learning styles. It cannot be said for sure that these recommendations will improve the quality of the two courses, but the students and the lecturers were enthusiastic about the recommendations, and the lecturers said they were really going to use the recommendations. Not only the people involved were enthusiastic, also the used literature in this research project did help improve the quality of the two courses. Several sources were used, and the recommendations were based upon this literature. This were two major reasons to say that the quality of the RMME and OTE course will improve by using the recommendations.

The lecturers are already using some learning styles that fit with adult learning characteristics. For example the courses made use of a discussion board and a notice board. However, the use of these interaction (teaching) methods was not of high quality. For example the discussion board was hardly used. Also it is advised that the lecturers make use of more interaction (teaching) methods. This way more learning styles will be addressed and each student will have more opportunities to learn in his/her preferred learning style. The courses will be more attractive and students will learn better.

8.3 Follow-up studies

In this paragraph a couple of possible subjects and points of interest for follow-up studies are discussed in two sections: Section 8.3.1 will discuss how this research project can be improved; section 8.3.2 will discuss how the extend to which adults with several learning styles can be served, can be taken along in evaluation.

8.3.1 Improvement of this research project

There are a number of possibilities to get improved results from this research project. First of all, there can be more interviews with students, especially with online students. If the same information still holds, it is more convincing that it is a good reflection of the education offered. As a result, the reliability of this research project would improve, but conducting interviews is time consuming.

Another possibility, especially for the formative evaluation, would be to extend the time that students could respond to the questionnaire or the recommendations. Adult students, who are employed, may be very busy. They may, therefore, not always have the time to fill in a questionnaire or read the recommendations. That does not mean that they do not want to cooperate. If they get more time, it is conceivable that more responses are forwarded and can be used in the analysis. This will save the researchers time and should be taken into consideration during the planning stage of the research project. However, the more time there is between the course and the filling in of the questionnaire, the more information may be lost. This may reduce the reliability of the retrieved information.

When the recommendations next year are implemented, it is important to evaluate the implemented recommendations. This is important, because one needs to know if the recommendations improve the quality of the education or if the recommendations need to be adjusted even more to improve the quality even more.

In this research project there was only looked at the interaction methods in the blended learning environment that are offered or could be offered to the students and to what extend adults with several learning styles were served in the RMME and OTE courses. The University of South Australia, unit SEEC, would like to have proof that the LMEF Masters program is representative of best practice in postgraduate education, and that the program is meeting the needs of the students. Because the RMME and OTE were the only two courses running, they were investigated. It is possible that there should be other recommendations for other courses of the LMEF Masters program. If the lecturers of those courses are really into blended learning, it is possible that they do not need all the recommendations. It is also possible that those lecturers need other recommendations, for example how to give proper instruction, or how to make the meetings attractive. This is something that should be taken into consideration before adapting the written recommendations as an example for how it should be in the LMEF Masters program.

The LMEF Masters program was set up for students who work at DSTO. This year, there were also a few students who work at Tenix, a locally owned defence and technology contractor. There were only interviews with the contact person of DSTO, and the organization administering the LMEF Masters program for DSTO, AITEC. This was done, because the LMEF Masters program is specifically designed for DSTO. Maybe in the future more students of Tenix will enroll in the course. If this will be the case, in another research project someone also has to communicate with a contact person of Tenix.

8.3.2 Take the extend to which adults with several learning styles are served along in evaluation

There were no results found covering the last two years for the RMME and OTE course. To make sure that the courses are still representative of best practice, the university should make sure their questionnaires are completed and returned for analysis.

In this questionnaire there were no questions related to the use of learning styles in adult learning. Questions about this topic should be added to the questionnaire, to evaluate if the courses are representative of best practice. This could be done in another research project to determine what questions should be in the questionnaire. Also in this research it could be evaluated what the best submission time is. The students of the LMEF Masters program are adults, so they have to combine their studies with their busy work schedule. For them it is not possible to fill in the questionnaire any time.

The lecturers should, every time they offer the course, think about Kolb's Learning style model and the four learning styles diverging, assimilating, converging and accommodating, and make sure that each learning styles is addressed in their course. The teaching methods they use should fit with these learning styles.

8.4 Main question

In this last section, there will be looked at the main question of this research project: 'How can the 'Research Methods in a Multidisciplinary Environment' (RMME) an 'Operational Test and Evaluation' (OTE) courses of the LMEF Masters program ensure best teaching practice, so that several adult learning styles are addressed?'. When the lecturers of both courses want to ensure best teaching practice, they have to keep the adult learning characteristics used in this research project in mind, as well as Kolb's four learning styles. When they use these characteristics and learning styles in their teaching methods, they can ensure best teaching practice. The written implementation plan will help to achieve this.

9 References

- Akker, J., van den (2004). Curriculum perspectives: an introduction. In J. van den Akker, W. Kuipen & U. Hameyer (Eds.), *Curriculum Landscapes and trends* (pp.1-10). Dordrecht: Kluwer Academic Publishers.
- Althaus, S.L. (1997). Computer-mediated communication in the university classroom: An experiment with online discussions. *Communication Education*, 46, 158-174.
- Berkel, H.J.M., van & Starren, J. (1993). Beoordelen met studietoetsen. In: H.J.M. van Berkel & A.E. Bax (Eds.), *Beoordelen in het onderwijs. Een handleiding voor het construeren van toetsen en het evalueren van leerdoelen en onderwijsvormen* (pp. 13-19). Houten: Bohn Stafleu Van Loghum.
- Blackmore, J. (1996). Pedagogy: Learning styles: Preferences. Retrieved September 5, 2005 from <http://www.cyg.net/~jblackmo/diglib/styl-d.html>.
- Brennan, R.E., McFadden, M. & Law, E. (2001). *Review of research. All that glitters is not gold: online delivery of education and training*. Leabrook: NCVET.
- Caffarella, R.S. (2002). *Planning programs for adult learners. A practical guide for educators, trainers, and staff developers*. Second edition. San Francisco: Jossey-Bass.
- Chapman, A. (1995-2005). *Kolb learning styles*. Retrieved September 1, 2005, from <http://www.businessballs.com/kolblearningstyles.htm>.
- Conner, M.L. (2005). *Introduction to learning styles*. Retrieved September 1, 2005, from <http://agelesslearner.com/intros/lstyleintro.html>.
- Cross, P.K. (1981). *Adults as learners*. San Francisco: Jossey-Bass Inc. Publishers.
- Defence Science and Technology Organisation (2005). Retrieved November 16, 2005, from: <http://www.dsto.defence.gov.au/>.
- Defence Science and Technology Organisation (2005). *Continuing education initiative, Policy statement DSTO*. Adelaide: DSTO. Angus Massie.
- Defence Science and Technology Organisation (2005). *Continuing education initiative, Procedures and Guidelines*. Adelaide: DSTO. Angus Massie.
- Dempster, M., & Raff, D. (1992). *Class discussions: a powerful classroom strategy*. Australia: Hawker Brownlow Education.
- DeSimone, R.L., Werner, J.M., Harris, D.M. (2002). *Human Resource Development*. Third edition. Orlando: Harcourt College Publisher.
- Driscoll, M & Carliner, S. (2005). *Advanced web-based training strategies*. San Francisco: Pfeiffer.
- Fogarty, J.R. & Pete, B.M. (2004). *The adult learner: Some things we know*. Morabbin: Hawker Brownlow Education.
- Fulford, C.P., & Zhang, S. (1993). Perceptions of interaction: The critical predictor in distance education. *American Journal of Distance Education*, 9(3), 8-12.
- Hanna, D.E., Glowacki-Dudka, M. & Conceição-Runlee (2000). *147 practical tips for teaching online groups. Essentials of web-based education*. Madison: Atwood Publishing.
- Hobbs, T. (1992). *Experiential Training*. Londen: Tavistock/Routledge.
- Kearsly, G (1994-2005.) *Exploration in Learning & Instruction: The theory into practice database*. Retrieved August 3, 2005, from <http://tip.psychology.org>.
- Kessels, J.W.M. & Poell, R.F. (2001). *Human Resource Development. Organisieren van het leren*. Samsom: Groningen.
- Klink, M. (2006). *The use of interaction methods in a blended learning environment*. Enschede: University of Twente.
- Kolb, D.A. (1984). *Experiential learning. Experience as the source of learning and development*. Englewood Cliffs, New Jersey: P T R Prentice Hall.
- Kolb, D. (1985). *Learning style inventory*. Boston: McBer and Company.

- Knowles, M.S. (1980). *The modern practice of adult education: from pedagogy to andragogy*. New York, Cambridge.
- Learning style inventory based on David Kolb's model*. (n.d.). Retrieved September 1, 2005, from www.cloudnet.com/~edrbsass/kolblearningstyle.html.
- McInerney, D.M. & McInerney, V. (2002). *Educational psychology. Constructing learning*. Frenchs Forest, N.S.W. : Prentice Hall/Pearson Education.
- McVay Lynch, M. (2004). *Learning online: a guide to success in the virtual classroom*. New York: RoutledgeFalmer.
- Moran, J.J. (1997). *Assessing adult learning. A guide for practitioners*. Florida: Krieger Publishing Company.
- Palloff, R.M. & Pratt, K. (2003). *The virtual student. A profile and guide to working with online learners*. San Francisco: Jossey-Bass.
- Palloff, R.M. & Pratt, K. (2005). *Collaborating Online. Learning together in community*. San Francisco: Jossey-Bass.
- Phillips, J.J. (1997). *Handbook of training evaluation and measurement methods*. Houston: Gulf.
- Richards, L.J., Dooley, K.E. & Lindner, J.R. (2004). Online course design principles. In C. Howard, K. Schenk & R. Discenza, *Distance learning and university effectiveness: changing educational paradigms for online learning* (pp. 235-253). Hershey: Information Science Publishing.
- Russell, C.K., & Gregory, D.M. (2003). Evaluation of qualitative research studies (Electronic version). *Evidence-Based Nursing*, 6, 36-40.
- Shindler, J. & Yang, H. (2004). *Paragon Learning Style Inventory*. Retrieved September 5, 2005, via California State University, Los Angeles and Stat University of New York, Oswego: <http://www.calstatela.edu/faculty/jshindl/plsi/4dimen.htm>.
- Slavin, R.E. (1992). *Research methods in education*. Needham Heights: Allyn and Bacon.
- Tessmer, M. (2001). *Planning and conducting formative evaluations*. Londen: Kogan Page.
- Thesis (n.d.). *Leerstijlentest van Kolb. Kolb's learning style test*. Retrieved September 1, 2005, from www.thesis.nl/kolb.
- Turoff, M., Discenza, R. & Howard, C. (2004). How distance programs will affect students, courses, faculty and institutional futures. In C. Howard, K. Schenk & R. Discenza, *Distance learning and university effectiveness: changing educational paradigms for online learning* (pp. 235-253). Hershey: Information Science Publishing.
- University of South Australia (2005). *Systems Engineering & Evaluation Centre*. Retrieved November 16, 2005, from www.unisa.edu.au/seec.
- Vockell, E.L. & Asher, J.W. (1995). *Educational Research*. Englewood Cliffs: Prentice-Hall.
- Vos, H. & Vlas, H. (2000). *Reflectie en actie*. Retrieved at October 25, 2005, via University of Twente, DINKEL Instituut / Faculteit der Elektrotechniek: <http://www.utwente.nl/itbe/owk/publicaties/onderbouwing/doc00-07.pdf>
- Willing, K. (1988). *Learning styles in adult migrant education*. NCRC Research Series: Adelaide.
- Worthen, B.R. & Sanders, J.R. (1987). *Educational evaluation: alternative approaches and practical guides*. White Plains: Longman.
- Zemke, R. & Zemke, S. (1995). Adult learning: what do we know for sure? *Training: the magazine of human resources development*. 32 (6). 31- 44.

Appendixes

Appendix 1: Interview questions lecturers

General questions:

1. What is your general opinion about the course?

Discuss:

- Curriculum level implemented
- 10 Curriculum components

Adult learning

2. Are they obligated to follow the courses, or are they allowed to volunteer?
3. How are you trying to make the learners feel comfortable in a learning situation?
4. Do you think the content of the course fits with the basis knowledge of the learners?
Please explain.
5. Does the content of the course fit with the personal work situation and life situation of the learners? Please explain.
6. Do you pay specific attention to the various backgrounds of the learners?
7. What do you think of the workload for this course?
8. How does the course encourage and facilitate opportunities to interact with fellow learners?
9. How do you stimulate group work/discussions?
10. In what way are you helping the learners if they have a problem/question?
11. In what ways is it possible for the learners to collaborate with other learners?
(discussion board, chats, e-mail, face-to-face (online, real-time))
12. How are you motivating and encouraging the learners?
13. What kinds of teaching methods do you use in the courses (during meetings and online)?
Why?
14. What kind of learning styles do you make use of? In what ways?
15. How are you trying to make variation in your course?
(PowerPoint, simulations, case studies, group work, self-assessments, reading, video/DVD)

Interaction in blended learning

16. What is your personal opinion about online learning? Why?
17. What kind of delivery environment do you prefer? Why?
(Synchronous: online at the same time and place; asynchronous: non-real-time; blended: synchronous and asynchronous)
18. What kinds of interaction do you find important? Why?
(human interaction: learner-teacher, learner-learner, learner-guest expert or learners-community member; non-human interactions: learner-content, learner-environment)
19. What is your overall opinion about the e-learning environment? Why?
20. May you give 2 positive points of the e-learning environment? Why?
21. May you give 2 points that can be improved of the e-learning environment? Why?
22. What kinds of interaction methods do you find important in an e-learning environment?
Why?
(case study, game-based, physical, process (step), role play, software, discussion board, notice board, hyperlinks, interactive animations and media, pop-ups, practice exercises, pretest/post-test, recorded lectures, (recorded) live virtual classroom, e-books, e-mail, phone, chat)
23. What kinds of interaction methods do you find important in a traditional face to face classroom? Why?
(group work, classroom discussion, problem solving, student research)

Appendix 2: Interview questions students

General questions:

What is your general opinion about the course?

Discuss

- Curriculum level attained
- 10 Curriculum components

Adult learning styles

Adult learning questions:

1. Why are you doing this course?
2. What is your goal for doing this course?
3. Is it important for you to pass for this course? Why/why not?
4. Do you find it difficult to motivate yourself to do something for this course? Can you explain your answer?
5. Do you think the content of the course fits with your basic knowledge? Please explain.
6. Does the content of the course fit your personal work situation and life situation? Please explain.
7. Is the course material relevant for your work? In what way?
8. Is it clear what is expected from the assessment/assignments?
9. What do you think of the workload for this course?
10. Does the course encourage and facilitate opportunities to interact with fellow students?
11. Are your fellow students helping you to learn more? In what way? (maybe by literature discussion, discussing the assignments, learning from other experiences).
12. Do you need more time and possibilities for discussing and interacting with fellow students? Please explain.
13. What do you think of the workshops/meetings for this course? Are they helping you, or do you feel it is a waist of time?
14. Do you think you have enough time between classes/workshops to think about the discussed topics or make the assignments?
15. Could you reach the materials for this course easily? (literature on the website/library, getting to assignments).

Questions about the professor:

16. Do you think the professor has sufficient knowledge of the subject matters discussed in this course?
17. Do you think there is enough guidance from the professor to help you when you have a problem, or a question?
18. Can the professor motivate and encourage you? Why/ why not?
19. Do you think the professor knows what kind of background you have (work experience, interests, diploma's/prior education).
20. Do you think it is important for you that the professor knows this?
21. Can you relate to the topics the professor uses when explaining something?
22. Do you think there's enough variation in the way the professor presents the content of the course (is he using PowerPoint, simulations, case studies, group work, self-assessments, reading, video/DVD).
23. Do you think there are enough possibilities for you to enhance your learning process?

Questions about learning styles/ teaching methods:

24. May you describe types of teaching methods you learn most from? Please explain.
25. May you describe teaching methods you learn least from? Please explain.

For the RMME course:

26. What do you think of spending a whole day in class?
27. What do you prefer: one whole day, or 2 different day-parts? Please explain.

For the OTE course:

28. Would you prefer more meetings, or longer workshops? Please explain.

Blended learning

Delivery environment

29. What kind of delivery environment do you prefer? Why?
(Synchronous: online at the same time and place; asynchronous: non-real-time; blended: synchronous and asynchronous)
30. What's your opinion about the delivery of the courses RMME and OTE?

Kinds of interaction

31. What kinds of interaction are used in the blended learning environment/e-learning environment?
(human interaction: learner-teacher, learner-learner, learner-guest expert or learners-community member; non-human interactions: learner-content, learner-environment)
32. What do you think of these kinds of interaction?
33. What kinds of interaction do you prefer? Why?

Blended learning environment

34. What is your general opinion about traditional face to face learning? Why?
35. What is your general opinion about online learning? Why?
36. What is your overall opinion about the e-learning environment? Why?
37. What is your overall opinion about the face to face lessons? Why?
38. May you give 2 positive points of the e-learning environment and face to face lessons? Why?
39. May you give 2 points that can be improved of the e-learning environment and face to face lessons? Why?
40. What is your opinion about the use of the discussion board?
41. Learners aren't using the discussion board a lot; can you give a reason(s) for that?
42. What is your opinion about the use of the notice board?
43. What is according to you the best way to corresponded during group work in an online environment?
(email, telephone, discussion board)

Preferences of interaction methods that can be used in blended learning environment

44. Do you prefer pre-test/post-test? Why?
45. Do you prefer Practice Exercises? Why?
46. Do you prefer the use of hyperlinks? Why?
(an image or piece of text that can link to another web page)
47. Do you prefer Interactive animations and media? Why?
48. Do you prefer covert questions? Why?
(questions that learners answer or consider in their minds rather than respond to in an overt way such as selecting a multiple-choice distracter, filling in a box, or dragging items across the screen?)
49. Do you prefer pop-ups? Why?

50. Do you prefer simulations? Why? (case study, game-based, physical, process (step), role play, software)
51. Which kind of simulation do you prefer the most? Why?
52. Do you prefer recorded lectures? Why?
53. Do you prefer a (recorded) Live Virtual Classroom? Why?
54. Do you prefer chat sessions? Why?
55. Do you prefer e-books, visiting sites?
56. What kinds of interaction methods do you prefer in a face to face classroom? Why?
(group work, classroom discussion, problem solving, student research)

Appendix 3: Developed questionnaire

Course evaluation RMME and OTE

Please put an 'x' in the box that is most suitable for you. With some questions there is an extra box, you can put a cross there if you are following this course face-to-face.

Course I followed:

RMME	
OTE	

Type of student:

Face-to-face	
Online	

1 = Strongly disagree

3 = Agree

2 = Disagree

4 = Strongly agree

Course content and process:	1	2	3	4
1. The overall course contributes to my knowledge and/or basic skill base.				
2. There is an adequate amount of time selected for each topic.				
3. The instructional and presentation techniques used are adequately assisting me in learning the material.				
4. I can relate the material to my particular life situation.				
5. The instructional materials and aids used (transparencies, manuals, videotapes, and the like) are enhancing my learning process.				
6. The discussions in group-work contribute to my learning process.				
7. The program schedule is well planned (for example, allowing enough time between sessions).				

Use of interaction in the e-learning environment (course website):	1	2	3	4
8. The use of email in this course is effective.				
9. The use of the discussion forum in this course is effective.				
10. The use of the notice board in this course is effective.				
11. Phone calls from the professor are effectively used.				
12. I would take another distance course with this professor.				
13. I would take another distance course.				
14. The amount of online interaction with the professor and other students is sufficient.				
15. Often I feel 'lost' in the e-learning environment (course website).				
16. I am very comfortable with using computers: Internet, upload/download of files, Word, Excel, and PowerPoint.				
17. I would have learned more if I had taken this class on-campus (as opposed to online).				
18. I miss the interaction of a 'live', traditional classroom.				
19. The e-learning environment is motivating.				

Preferences e-learning environment (course website):	1	2	3	4
20. I prefer an asynchronous environment (non-real-time).				
21. I prefer a synchronous environment (same time and place in a traditional classroom).				
22. I prefer a synchronous environment (same time in a Live Virtual Classroom).				
23. I prefer a blended learning environment (non-real-time and same time and place in a traditional classroom).				
24. I prefer a blended learning environment (non-real-time and same time in a Live Virtual Classroom).				
25. I prefer the use of a discussion board.				
26. I prefer the use of a notice board.				
27. I prefer online practice exercises (practice the behaviour specified in the objectives) in an e-learning environment.				
28. I prefer Live Virtual Classroom sessions in an e-learning environment.				
29. I prefer simulations in an e-learning environment.				
30. I prefer interactive animations and media in an e-learning environment.				
31. I prefer the use of hyperlinks in an e-learning environment.				
32. I prefer pop-ups in an e-learning environment.				
33. I prefer recorded lectures in an e-learning environment.				
34. I prefer chat sessions in an e-learning environment.				
35. I prefer pre-test / post-test in an e-learning environment.				

The professor:	1	2	3	4
36. The professor makes an effort to help me feel comfortable.				
37. The professor provides me with adequate assistance in learning the material.				
38. The professor presents the lesson in steps that I can follow.				
39. Feedback from the professor is timely.				
40. I receive personalized feedback from the professor.				
41. The professor communicates well with the participants (for example, attend to diversity of audience).				
42. The professor holds my interest.				
43. The professor makes me think for myself.				

Learning style preferences:	1	2	3	4
44. I prefer to read information.				
45. I prefer working with graphics or diagrams to represent information.				
46. I prefer to hear material being presented.				
47. I prefer physical, 'hands-on' activity.				
48. I prefer working with others.				
49. I prefer reflection.				

Overall program:	1	2	3	4
50. I am challenged by the content of the course.				
51. I am challenged by the way the material is taught.				

Open questions:

Please comment on the major strengths of the program and changes you would recommend.

Major strengths (Please explain):

Suggestions for improvement (Please explain):

Other comments:

Appendix 4: Results research question 1 RMME

In this appendix the following results of research question 1 ‘What is the quality of the RMME and OTE courses of the LMEF Masters program by looking at the degree in which the courses can serve adults with several learning styles?’ for the RMME course will be presented:

- The results of the analysis of the course website.
- The results from the analyses of the AITEC questionnaires in 2003 and 2004.
- The results of the developed questionnaire.
- The results of the interviews with students and the lecturer of the course.

After each section a sub-conclusion will be given.

When there is talked about ‘students’ it means face-to-face and online students. When this is not the case, it will be mentioned otherwise. When there is spoken about some students, this means that this could be 2 students or less. When there is spoken about most students, this means 3 students or more.

Results from the analysis of the course website

One of the first activities that took place was the analysis of the course website. Below, the results of this analysis will be presented. The results are subdivided into adult learning characteristics and learning styles/teaching methods. Finally, a conclusion is provided.

Adult learning characteristics

Pre-requisite knowledge

In the course outline document provided in the course website, it was said that students did not need any prerequisite skills.

Aims and objectives

On the university website some information was provided about the content of the course. In the course outline document aims and objectives were provided for the RMME course.

Relevance of the material

There were articles and chapters of a book provided on the website that the students had to read to make the assignments. Also additional articles and references to books were provided by the lecturer.

Assessment requirements

There were seven tutorials, students had to do these. Students also had to write a research proposal. Each assessment could be found on the website. The course outline document spent a section on the assessment, providing assessment criteria too.

Administrative support

On the university website and the course website there were several links offered for help. These links directed a student to a link with more links for help. In the course website there was one page called ‘Getting Help’, and there was a link to the ‘Help-page’ of the universities website.

Combining study and work

Students had to write a proposal at the end. The information provided on the website was making clear that students could choose their own topic/problem. They could choose a topic related to their work.

Interaction facilities

Students could use the discussion board to interact with each other. The lecturer could post messages on the notice board. Students could click in the website for contact details from the lecturer. This was also the place where they could find contact information of other distance mode students. These contact details were not provided directly on the course website; students who wanted to make their contact details available to other students could send an e-mail to the lecturer. Students were able to call or e-mail the lecturer, once they found the information in the course website.

Facilities

An instruction was provided with steps about where to find the information. For example, students needed to find online literature, but the steps they had to take to find that literature were provided.

Academic support

Students could e-mail or phone the lecturer.

Access to materials

Via the university website students could enter the course website. Both websites provided several support links.

Group interaction

This is made possible via the discussion board. It was not used very much. Students could also have interaction with each other in the face-to-face meetings.

Support lecturer

Students could e-mail or phone the lecturer. The lecturer provided general feedback to the students on the notice board. The course website provided a lot of support links like 'Learning online'.

Learning styles/ Teaching methods

The course mainly used PowerPoint presentations and a couple of activities in which the students had to give an answer to different questions. The last assignment was writing a research proposal, so they had to use all their learned skills in this assignment. Next to this, the students had to read articles and the book belonging to this course.

Sub-conclusion

Adult learning characteristics

Materials and additional articles and references were provided on the course website. There were several links offered for help for administrative support. The website made use of the discussion board. This is where the students could have group-interaction, but it was not used very often. Contact details (e-mail address and phone number) from the lecturer were available. General feedback was provided on the notice board.

Learning style/Teaching methods

The course website mainly used PowerPoint presentations and articles: mainly the learning style reading must be used by the students in this course. There was not a lot variety in teaching methods.

Results from the AITEC questionnaire

One of the activities of the evaluation phase was analysing the AITEC questionnaires of 2003 and 2004. To determine the profile of the RMME course the LMEF Masters at SEEC at that moment.

In the following sub-sections the results of the AITEC questionnaire of 2003 and 2004 will be presented. The results are shown in percentages. Each section starts with a summary and ends with a conclusion.

Results from the AITEC questionnaire RMME 2003

Total number of students: 47

Total number of responses: 29

Of the 29 students who responded, 23 students completed the questions relating to the face-to-face delivery and 18 students completed the questions about the online delivery. Some students did experience both delivery modes. That is why the number of students ranges per question.

Summary

A large majority of students who completed this evaluation felt that:

- they had adequate pre-requisite knowledge of the demands of the course
- the aims and objectives were clear
- the course developed their understanding of concepts and principles
- the course material was relevant to their work
- the course material was pitched at the appropriate level
- the assessment requirements were relevant and clear
- the workload for this course was reasonable
- the university application and enrolment phase was well managed
- appropriate administrative support was available
- the course encouraged and facilitated opportunities to interact with DSTO colleagues
- the lecturer had sufficient knowledge of the subject matter
- the lecturer was well prepared
- the lecturer showed enthusiasm for the course

Most students who completed this evaluation felt that academic support outside the face-to-face teaching was available.

A mixed response was received with regards to the advertisement and explanation of the CEI program. Another mixed response was received from the students about the statement that they were able to manage their study demands and work commitments effectively. Mixed responses were also received about the statements that the students had ready access to online materials and text books, that the lecturer provided suitable support for the learning process and that there were opportunities for group/class interaction and collaboration available.

Most students felt that the venue and facilities were not appropriate.

Below, in table 6, the results of the AITEC questionnaire 2003 will be presented in percentages.

Table 6
Results AITEC questionnaire 2003

Question	Agree	Disagree	Undecided
<i>Responses were received from 62% of the students who studied this course.</i>			
I had adequate pre-requisite knowledge for the demands of this course.	72%	14%	14%
The aims and objectives of the course were clear.	72%	14%	14%
The course developed my understanding of concepts and principles.	69%	14%	17%
The course material was relevant to my work at DSTO.	65%	31%	4%
The course material was pitched at the appropriate level.	73%	20%	7%
The assessment requirements were relevant and clear.	59%	21%	20%
The workload for this course was reasonable.	66%	21%	7%
The CEI program was well advertised and explained.	48%	38%	14%
The university application and enrolment phase was well managed.	66%	24%	10%
Appropriate administrative support was available.	64%	14%	24%
I was able to manage my study demands and work commitments effectively.	49%	31%	20%
The course encouraged and facilitated opportunities to interact with DSTO colleagues.	55%	17%	28%
<i>Responses were received from 49% of the students who studied this course.</i>			
The lecturer had sufficient knowledge of the subject matter.	78%	13%	9%
The lecturer was well prepared.	78%	13%	9%
The lecturer showed enthusiasm for the course.	74%	13%	13%
Academic support outside of face-to-face teaching was available.	48%	26%	26%
The venue and facilities were appropriate.	22%	52%	26%
<i>Responses were received from 38% of the students who studied this course.</i>			
I had ready access to online materials and text books.	28%	34%	38%

The lecturer provided suitable support for the learning process.	28%	39%	33%
Opportunities for group/class interaction and collaboration were available.	39%	28%	33%

Comments made by students who filled in the AITEC questionnaire 2003:

What could be improved?

- A major comment that a lot of students made was the lack of feedback.
- A second major comment is regarding the effectiveness of the delivery mode. The students were saying they did not like to sit all day in class; they did not find it effective.
- The students had to repeat what was told in the lecture slides and they did not focus enough on principles of research.
- The research methods used in this course and the ones used in DSTO did not fit with each other. It would be better to place this more within the DSTO context.

Positive comments:

The lecturer is a good, approachable lecturer and was well organized.

Sub-conclusion

The advertisement and explanation of the CEI program must be improved. Students were not able to manage their study demands and work commitments effectively. Students want to have more ready access to online materials and text books. Not all students thought that the lecturer provided suitable support for the learning process and there were not enough opportunities for group/class interaction and collaboration available for all students. The students were not satisfied about the effectiveness of the delivery mode. They did not like to sit in class all day.

Most students felt that the venue and facilities were not appropriate. This needs to be improved. Most students felt that there was a lack of feedback, this needs to be improved.

Results of the AITEC questionnaire RMME 2004

Total number of students: 29

Total number of responses: 25

Summary

A large majority of students who completed this evaluation felt that the:

- course content met their expectations
- course materials/resources enhanced their learning
- assessment requirements were fair
- course delivery mode was effective
- lecturer was knowledgeable
- lecturer enhanced their understanding of the subject
- workload was reasonable
- course was relevant to their work.

Most students felt that the university facilities and equipment were suitable and that the lecturer created an environment conducive to learning with some students undecided.

A mixed response was received with regards to students receiving adequate feedback on their work.

Below, in table 7, the results of the AITEC questionnaire 2004 will be presented in percentages.

Table 7
Results AITEC questionnaire 2004

Question	Agree	Disagree	Undecided
<i>Responses were received from 86% of the students who studies this course</i>			
Did the course content meet your expectations?	80%	8%	12%
Did the course materials/resources enhance your learning?	88%	4%	8%
Were assessment requirements fair?	80%	0%	20%
Was the lecturer knowledgeable?	100%	0%	0%
Did the lecturer enhance your understanding of the subject?	88%	4%	8%
Did you receive adequate feedback on your work?	40%	36%	24%
Was the workload reasonable?	96%	4%	0%
Were the university facilities and equipment suitable (e.g. website functionality)?	72%	0%	28%
Did the lecturer create an environment conducive to learning?	72%	0%	28%
Was this course relevant to your work?	84%	8%	8%

Sub-conclusion

The feedback on the students' work needs to be improved.

Results of the questionnaire developed by the researchers

In the section above the results of the AITEC questionnaire were presented. To get additional and more recent information about the specific topics of adult learning and learning styles, a new questionnaire was developed. The responses on the developed questionnaire can be found in table 8. After this table the responses on the open questions are presented. Finally, a conclusion is provided.

Total number of students: 20

Total number of responses: 10 (8 face-to-face and 2 online students)

Table 8
Results of the developed questionnaire RMME

Question	Answer face-to-face students	Answer online students
The overall course contributes to my knowledge and/or basic skill base.	Agree	Disagree
There is an adequate amount of time selected for each topic	Agree	Agree

The instructional and presentation techniques used are adequately assisting me in learning the material.	Agree	Strongly disagree
I can relate the material to my particular life situation.	Agree	Strongly disagree
The instructional materials and aids used (transparencies, manuals, videotapes, and the like) are enhancing my learning process.	Agree	Strongly disagree
The discussions in group work contribute to my learning process.	Agree	Strongly disagree
The program schedule is well planned (for example, allowing enough time between sessions).	Strongly agree	Disagree
The amount of online interaction with the lecturer and other students is sufficient.	Agree	Strongly disagree
The lecturer makes an effort to help me feel comfortable.	Agree	Disagree
The lecturer provides me with adequate assistance in learning the material.	Agree	Strongly disagree
The lecturer presents the lesson in steps that I can follow.	Strongly agree	Strongly disagree
Feedback from the lecturer is timely.	Agree	Strongly disagree
I receive personalized feedback from the lecturer.	Agree	Disagree
The lecturer communicates well with the participants (for example, attend to diversity of audience).	Strongly agree	Disagree
The lecturer holds my interest.	Agree	Disagree
The lecturer makes me think for myself.	Agree	Disagree
I prefer to read information	Agree	Strongly agree
I prefer working with graphics or diagrams to represent information.	Agree	Agree
I prefer to hear material being presented.	Agree	Disagree
I prefer physical, 'hands-on' activity.	Agree	Agree
I prefer working with others.	Agree	Agree
I prefer reflection.	Agree	Agree
I am challenged by the content of the course.	Agree	Agree
I am challenged by the way the material is taught.	Agree	Agree

Open questions questionnaire

Major strengths according to comments made by the face-to-face students:

According to the face-to-face students, major strengths were well thought and presented lectures, because of this the students enjoyed the course. Teaching materials were 'tailor-made' to the workplace and tutorial and group aspects were presented in the lectures. Other major strengths are the comprehensiveness of the material and the classroom interaction.

Suggestions for improvement according to comments made by the face-to-face students:

According to the face-to-face students, they would like to receive more feedback on their

assignment results. It is hard for the students to keep concentration for a whole day of lectures. They would like to have more variety in the way topics are presented during the classroom sessions.

Suggestions for improvement according to comments made by the online students:

According to the online students, the PowerPoint slides must be more comprehensive. Because the online students cannot attend the classroom sessions they need more explanation. The learning environment is not attractive for them, because there are only PowerPoint slides. Online students would like to receive timely and personalised feedback on assignments, so that they get a feel for where their understanding of the subject matter is weak and where it is strong. Online students have the feeling that they are neglected in comparison to the face-to-face students.

Sub-conclusion

According to the online students there are no major strengths. The face-to-face students are more positive about their learning environment. For online students there need to be more variety in teaching methods. All students would like to receive more feedback.

Results from the interviews with students and the lecturer of the RMME course

Besides analysing the course website, analysing the questionnaire of AITEC and analysing the developed questionnaire, also interviews with students of the RMME course and the lecturer were undertaken. In chapter 2 the theoretical framework for this research was explained. Adult learning and characteristics of adult learners were determined. Besides that, it was explained what learning styles are and how one should take them into account when teaching a course to adults. In the interviews with the students and lecturer the focus was on these findings.

In this section an overview of the responses of the students and the lecturer will be given. The results are revealed per heading supporting previous findings in the literature.

General

The lecturer's general opinion about his course was that he is satisfied with it. The feedback the lecturer received from the students was positive. Students seemed to like the course. The lecturer would like to upgrade and improve notes or add something, but most of the time he starts doing this one week before the course starts.

Adult learning characteristics

Goal for doing this course

According to the students and the lecturer the goal for doing this course was getting their Masters degree. The goal for all the students was to learn more about the research methods.

Important to pass for this course

It was important for the students to pass this course, for themselves and for personal reasons. If they did not pass, DSTO would probably not pay for the courses of the students anymore. Getting a Masters degree can enhance the chances of getting a promotion in the future.

Comfortable with learning

According to the students and the lecturer, the lecturer was very approachable. His way of presenting subjects made the students feel comfortable. The lecturer spent no time for an introduction. According to him, a lot of the students knew each other already.

Motivation

Some students said it was not difficult for them to motivate themselves. Some students said it was sometimes difficult to motivate themselves. The students motivated themselves by taking course work home when they are busy at work. Deadlines were motivating and when the topic related to their work this also motivated them.

Level of the content

The content of the course fit with the background of most students. The students did not find it annoying to repeat some content. For some students the content did not fit with their personal background.

Assignments

For some students it was clear what was expected from the assignments. For the online student it was not really clear, because they did not receive an answer immediately when they asked a question, like they would get in classroom sessions. Other ways for all students to get an answer to assignment related questions were by looking it up in the course guide, by e-mailing the lecturer and by reading the notes.

Workload

All the students and the lecturer thought the workload was good.

Interaction facilities

For online students there were not enough facilities to interact with other students. The discussion board was not used very much; so it was not very helpful for them. They would like to have more contact with other students.

The face-to-face students and the lecturer thought that the course did encourage and facilitate opportunities to interact with fellow students.

Besides the meetings the lecturer left it up to the students to contact fellow students, but he did make suggestions for having interaction with each other out of the meetings.

Group-work

All students found group work difficult. This was because some people had a very strong opinion, communication within the group was not going right, or group members were not doing their work. They all found group-work in general good, because they could hear somebody else's opinion and they could have discussions with each other.

According to the lecturer, the students were used to working together.

The online students could use the discussion board, but it was very difficult for the lecturer to get them to use it.

Lectures

The face-to-face students thought the lectures were helping them, because there were discussions with other students. The lectures were motivating them to read a book or finish an assignment. There was also someone reminding you in the class that you had to do something for the next week, or the next meeting.

All the students thought interaction is very important.

Feedback

The students did not get any marks back yet, so they did not know how far learning had progressed. Some general feedback was placed on the discussion board, so everyone knew this. Sometimes the feedback on the assignments was timely. The students thought feedback was important, because they could learn a lot from it. They preferred to have more (individual) feedback.

According to the lecturer he did not have enough time to give more individual feedback.

Materials

All students said that the materials for this course could be reached easily. The students used the website and the book for this course. This book was available in the library.

Knowledge of the lecturer

All students thought the lecturer had sufficient knowledge of the subject matters discussed in the course. They thought it was important that the lecturer had this, so students had confidence in him. Else they would lose the respect for the lecturer.

Guidance from the lecturer

The face-to-face students thought there was enough guidance from the lecturer. The online students did not think there was enough guidance from the lecturer. They had to wait a couple of days for a response when they send an e-mail with questions in it to the lecturer. Online students had not used the telephone to communicate with each other, or with the lecturer.

Motivation by the lecturer

Only the online students could not be motivated by the lecturer. That was because they had never met or spoken to each other. The face-to-face students were motivated because the lecturer was very enthusiastic, the lecturer tried to make them think for himself about the subject. What also motivated them is that the examples used were relevant to their work, the lecturer knew what kind of work the students did, and the lecturer had experience in that field. The lecturer tried to motivate the students by answering their questions, by providing examples that were relevant for them and that interested them. In the workshops he tried to motivate them by giving them short brakes and to have a variety of teaching methods in the day. So the students were not only listening to PowerPoint presentations, but also had group discussions.

Personal background and the lecturer

The students all thought the lecturer did not know their background, only in general what kind of work the students did. The lecturer agreed with this. Some students said it was important that the lecturer knew something about the background of the students, because than the lecturer could adjust the education more. Some students did not find it important that the lecturer knew the personal background of the students.

Examples used

The defence examples used in the sessions were good, because they were related to the students' work situation. Using some examples with a different content (like basket ball playing) was good sometimes, because it helped to think in a different context.

Learning styles

All students said they learned the most in this course from *reading*. There were possibilities to *have contact with other students* in the e-learning environment, but most of the time students

did not do that. When they were able to meet each other and have real discussions, then the students could learn from that.

According to the lecturer the learning style mainly used during the classroom sessions is *audio*. The tutorials during the classroom sessions gave opportunities to *work together and discuss*. The lecturer would like to have more diagrams and pictures in his PowerPoint slides to support some of the material.

Teaching methods

All students said there was not a lot of variation in the way the lecturer presented the content, they would like to have this more. Now there were only PowerPoint presentations. A whole day of lectures during the classroom sessions is too much. A whole day is possible, but it depends on the activities during the day. Teaching methods students learn most from are teaching methods where a lot of interaction is involved, not only teaching methods where they have to listen to. The students would like to participate and learn from group discussions, case studies, quizzes and role play. According to the students it is most important that there is variation.

The lecturer did not use quizzes, because it would be very labour intensive to make it meaningful. He did not think it was worth the effort. The textbook had a website with quizzes. The students could do those, informal. The lecturer recommended this, it was not compulsory.

Sub-conclusions

In general, the lecturer and the face-to-face students agreed. The online students disagreed most of the time with the face-to-face students and the lecturer. The major comment of the students and the lecturer were that the course needs more variation in the way it presents the material.

Appendix 5: Results research question 1 OTE

In this appendix the following results of research question 1 ‘What is the quality of the RMME and OTE courses of the LMEF Masters program by looking at the degree in which the courses can serve adults with several learning styles?’ for the OTE course will be presented:

- The results of the analysis of the course website.
- The results from the analyses of the AITEC questionnaires in 2003 and 2004.
- The results of the developed questionnaire.
- The results of the interviews with students and the lecturer of the course.

After each section a sub-conclusion will be given.

When there is talked about ‘students’ it means face-to-face and online students. When this is not the case, it will be mentioned otherwise. When there is spoken about some students, this means that this could be 2 students or less. When there is spoken about most students, this means 3 students or more.

Results from the analysis of the course website

One of the first activities that took place was the analysis of the course website. Below, the results of this analysis will be presented. The results are subdivided into adult learning characteristics and learning styles/teaching methods.

Adult learning characteristics

Pre-requisite knowledge

The textbook used in the pre-requisite for this course (Principles of Test and Evaluation) was provided in the ‘Additional Resource’ section on the website, for students to revise details they may have forgotten or did not know.

Aims and objectives

On the university website some information was provided about the content of the course. In the course outline document aims and objectives were provided for the OTE course.

Relevance of the material

There were articles and a book provided that the students had to read to make the assignments. Also additional articles and references to books were provided by the lecturer.

Assessment requirements

There were four tutorials; students had to do these in groups. Students also had to write a research paper and write a review of somebody else’s paper. Each assessment could be found on the website. The course outline document spent a section on the assessment, providing assessment criteria too.

Administrative support

There were contact details of the Program Support Officer for this course provided. He could assist with administrative matters. On the university website and the course website there

were several links offered for help. These links directed a student to a link with more links for help. In the course website there was one page called 'Getting Help'.

Combining study and work

Students had to write a paper at the end. The information provided on the website was making clear that students could choose their own topic/problem. They could choose a topic related to their work.

Interaction facilities

Students could use the discussion board to interact with each other. The lecturer could post messages on the notice board. Students could click in the website for contact details from the lecturer. This was also the place where they could find contact information of the Program Support Officer for this course. Students who wanted to make their contact details available to other students could post them on the discussion board. This was not done.

Facilities

An instruction was provided with steps about where to find the information. For example, students needed to find online literature, but the steps they had to take to find that literature were provided.

Academic support

Students could e-mail or phone the lecturer.

Access to materials

Via the university website students could enter the course website. Both websites provided several support links. All materials were provided online.

Group interaction

This is made possible via the discussion board. It was not used very much. Students could also have interaction with each other in the face-to-face meetings.

Support lecturer

The lecturer provided feedback to the students via e-mail, or by using post. No general feedback was found on the website.

Students could e-mail, phone or fax the lecturer. They could also come and see the lecturer on Thursday's and Friday's the Mawson Lakes Campus of UniSA. But it was advised to first check the availability of the lecturer before coming.

Learning styles/ Teaching method

The course used PowerPoint presentations and tutorials. One of the last assignments was writing a research paper, so they had to use all their learned skills in this assignment, and reviewing somebody else's paper. Next to this, the students had to read articles and the book belonging to this course. They had to watch a video too.

Sub-conclusion

Adult learning characteristics

Materials and additional articles and references were provided on the course website. There were several links offered for help for administrative support. The website made use of the discussion board. This is where the students could have group-interaction, but it was not used very often. Contact details (e-mail address and phone number) from the lecturer were

available. No general feedback was provided on the notice board. The lecturer provided some chapters of a book online, to make sure that each student had the right pre-requisite skills.

Learning style/Teaching methods

The course website mainly used PowerPoint presentations and articles: mainly the learning style reading must be used by the students in this course. There was not a lot variety in teaching methods.

Results from the AITEC questionnaire

One of the activities of the evaluation phase was analysing the AITEC questionnaires of 2003 and 2004. To determine the profile of the OTE course the LMEF Masters at SEEC at that moment.

In the following sub-sections the results of the AITEC questionnaire of 2003 and 2004 will be presented. The results are shown in percentages. Each section starts with a summary and ends with a conclusion.

Results from the AITEC questionnaire OTE 2003

Total number of students: 13

Total number of responses: 7

Of the 7 students who responded, 6 students completed the questions relating to the face-to-face delivery and 3 students completed the questions about the online delivery. Some students did experience both delivery modes. That is why the number of students ranges per question.

Summary

A large majority of students who completed this evaluation felt that:

- they had adequate pre-requisite knowledge of the demands of the course
- the aims and objectives were clear
- the course developed their understanding of concepts and principles
- the course material was relevant to their work
- the course material was pitched at the appropriate level
- the workload for this course was reasonable
- the university application and enrolment phase was well managed
- the course encouraged and facilitated opportunities to interact with DSTO colleagues
- the lecturer had sufficient knowledge of the subject matter
- the lecturer was well prepared
- the lecturer showed enthusiasm for the course
- the venue and facilities were appropriate
- the advertisement and explanation of the CEI program was good

Most students who completed this evaluation felt that academic support outside the face-to-face teaching was available, that appropriate administrative support was available and that they had ready access to online materials and text books.

A mixed response was received about the relevancy and clearness of the assessment requirements. Another mixed response was received from the students about the statement that they were able to manage their study demands and work commitments effectively.

All students were undecided about the statement that the lecturer provided suitable support for the learning process.

Most students felt that there were not enough opportunities for group/class interaction and collaboration available.

Below, in table 9, the results of the AITEC questionnaire 2003 will be presented in percentages.

Table 9
Results AITEC questionnaire 2003

Question	Agree	Disagree	Undecided
<i>Responses were received from 54% of the students who studied this course.</i>			
I had adequate pre-requisite knowledge for the demands of this course.	71%	29%	0%
The aims and objectives of the course were clear.	100%	0%	0%
The course developed my understanding of concepts and principles.	100%	0%	0%
The course material is relevant to my work at DSTO.	100%	0%	0%
The course material was pitched at the appropriate level.	86%	0%	14%
The assessment requirements were relevant and clear.	57%	0%	43%
The workload for this course was reasonable.	72%	14%	14%
The CEI program was well advertised and explained.	71%	0%	29%
The university application and enrolment phase was well managed.	86%	0%	14%
Appropriate administrative support was available.	57%	14%	14%
I was able to manage my study demands and work commitments effectively.	43%	43%	14%
The course encouraged and facilitated opportunities to interact with DSTO colleagues.	86%	0%	14%
<i>Responses were received from 46% of the students who studied this course.</i>			
The lecturer had sufficient knowledge of the subject matter.	100%	0%	0%
The lecturer was well prepared.	83.5%	16.5%	0%
The lecturer showed enthusiasm for the course.	83.5%	0%	16.5%
Academic support outside of face-to-face teaching was available.	49.5%	16.5%	33%
The venue and facilities were appropriate.	100%	0%	0%
<i>Responses were received from 23% of the students who studied this course.</i>			
I had ready access to online materials and	67%	33%	0%

text books.			
The lecturer provided suitable support for the learning process.	0%	0%	100%
Opportunities for group/class interaction and collaboration were available.	33%	67%	0%

Comments made by students who filled in the AITEC questionnaire 2003:

What could be improved?

The online students did not like it that they had not workshops to go to. They thought the workload was a little high and the due dates were not very flexible.

Positive comments:

The lecturer was knowledgeable.

Sub-conclusion

There needs to be more opportunities for group/class interaction and collaboration available. The assessment requirements need to be more relevant and clear. Not all students could manage their study demands and work commitments effectively. The students were all undecided about the statement that the lecturer provided suitable support for the learning process.

Results of the AITEC questionnaire 2004:

Total number of students: 11

Total number of responses: 6

Summary:

All students who responded to this evaluation strongly agreed or agreed that

- the lecturer was knowledgeable
- the lecturer enhanced their understanding of the subject
- they received adequate feedback on their work
- the university facilities and equipment were suitable
- the lecturer created an environment conducive to learning.

The majority of students felt that the course materials/resources enhanced their learning, that the workload was reasonable and that the course was relevant to their work.

Most students felt that the course content met their expectations and that the course delivery mode was effective with some students disagreeing.

A mixed response was received regarding the assessment requirements being fair.

Below, in table 10, the results of the AITEC questionnaire 2004 will be presented in percentages.

Table 10

Results AITEC questionnaire 2004

Question	Agree	Disagree	Undecided
<i>Responses were received from 55% of the students who studies this course</i>			
Did the course content meet your expectations?	83%	17%	0%
Did the course materials/resources enhance your learning?	83%	175	0%

Were assessment requirements fair?	50%	33%	17%
Was the lecturer knowledgeable?	100%	0%	0%
Did the lecturer enhance your understanding of the subject?	100%	0%	0%
Did you receive adequate feedback on your work?	100%	0%	0%
Was the workload reasonable?	67%	0%	33%
Were the university facilities and equipment suitable (e.g. website functionality)?	100%	0%	0%
Did the lecturer create an environment conducive to learning?	100%	0%	0%
Was this course relevant to your work?	83%	0%	33%

Comments made by students who filled in the questionnaire:

The students were pleased with the lecturer. The assignments were challenging and interesting. The students liked the idea of working in groups, but it is difficult to deal with the group dynamics. Some comments were made about the way the lectures were divided through this course.

Sub-conclusion

All students gave a positive response on all of the statements in this questionnaire. Students had difficulties with dealing with the group dynamics while working in groups. Not all students were pleased with the way the lectures were divided through the course.

Results of the questionnaire developed by the researchers

In the section above the results of the AITEC questionnaire were presented. To get additional and more recent information about the specific topics of adult learning and learning styles, a new questionnaire was developed. The responses on the developed questionnaire can be found in table 11. After this table the responses on the open questions are presented. Finally, a conclusion is provided.

Total number of students: 14

Total number of responses: 8 (4 face-to-face and 4 online students)

Table 11

Results of the developed questionnaire OTE

Question	Answer face-to-face students	Answer online students
The overall course contributes to my knowledge and/or basic skill base.	Agree	Agree
There is an adequate amount of time selected for each topic	Agree	Agree
The instructional and presentation techniques used are adequately assisting me in learning the material.	Disagree	Agree

I can relate the material to my particular life situation.	Agree	Agree
The instructional materials and aids used (transparencies, manuals, videotapes, and the like) are enhancing my learning process.	Agree	Agree
The discussions in group work contribute to my learning process.	Agree	Agree
The program schedule is well planned (for example, allowing enough time between sessions).	Agree	Agree
The amount of online interaction with the lecturer and other students is sufficient.	Disagree	Disagree
The lecturer makes an effort to help me feel comfortable.	Agree	Agree
The lecturer provides me with adequate assistance in learning the material.	Agree	Disagree
The lecturer presents the lesson in steps that I can follow.	Agree	Agree
Feedback from the lecturer is timely.	Agree	Agree
I receive personalized feedback from the lecturer.	Agree	Agree
The lecturer communicates well with the participants (for example, attend to diversity of audience).	Agree	Agree
The lecturer holds my interest.	Agree	Agree
The lecturer makes me think for myself.	Agree	Agree
I prefer to read information	Agree	Agree
I prefer working with graphics or diagrams to represent information.	Agree	Agree
I prefer to hear material being presented.	Agree	Agree
I prefer physical, 'hands-on' activity.	Agree	Strongly agree
I prefer working with others.	Agree	Agree
I prefer reflection.	Agree	Agree

Open questions questionnaire

Major strengths according to comments made by the face-to-face students:

The students thought the course was challenging, had good lecture notes and the instructions about the requirements for the assignments were clear. The material was well presented and easy to read and understand. During group work the groups consisted of local and interstate students. The experience of the lecturer with the defence field was helpful for the students to relate their experience with the lecturing materials and examples. The workload was about right.

Major strengths according to comments made by the online students:

It was easy to access lecture notes, course information, reference material and assessment notes on the website. The course was well structured and programmed. The courses website was easy to interpret and navigate throughout.

Suggestions for improvement according to comments made by the face-to-face students:

When there are both local and interstate students working together in one group, there needs to be more coordination. Assignments need to be checked early by the lecturer for each group to ensure they are on the right track. The face-to-face students would like to have more good and bad examples and then discuss these examples in the classroom sessions. Finally, the course notes need to be made available online 3-4 weeks in advance, so students can adjust their personal life situation to it.

Suggestions for improvement according to comments made by the online students:

The online students would like to have all the assignments and coursework given to them at the start of the semester, or at least a couple of weeks in advance. This way, students can adjust their personal life situation to it. They prefer to get printed copies of lessons and coursework as it takes them a lot of time to download everything and print it. They like to have more face-to-face meetings in which they can meet the other students and have discussions. According to the online students, the tutorials would be of much greater benefit if the lecturer was able to provide more direction to the expected results. They would like to have more interaction with the lecturer to ask questions. When the online students ask a question, they would like to get an answer sooner. The online notes need to be more detailed, because it is all they can refer to. The online students would like to have more discussions on examples.

Sub-conclusion

The instructional and presentation techniques used were not adequately assisting the face-to-face students in learning the material. The lecturer did not provide the online students with adequate assistance in learning the material. The online students would like to have classroom sessions. They would like to get an answer on their questions quicker than they get it now. For the online students, the online notes need to be more specific.

The amount of online interaction with the lecturer and other students was not sufficient for all the students. All the students would like to get course material and coursework earlier, so they can adjust their personal life situation to it. All students would like to discuss more with each other, especially have discussions about examples.

Results from the interviews with students and the lecturer of the OTE course

Besides analysing the course website, analysing the questionnaire of AITEC and analysing the developed questionnaire, also interviews with students of the OTE course and the lecturer were undertaken. In chapter 2 the theoretical framework for this research was explained. Adult learning and characteristics of adult learners were determined. Besides that, it was explained what learning styles are and how one should take them into account when teaching a course to adults. In the interviews with the students and lecturer the focus was on these findings.

In this section an overview of the responses of the students and the lecturer will be given. The results are revealed per heading supporting previous findings in the literature.

Adult learning characteristics

Goal for doing this course

Most students and the lecturer said they were doing this course to get their Masters degree.

Some students were doing this course because it was the only one available for them this semester. The lecturer added to this that the students chose to do this course; the course is an elective course.

Important to pass for this course

It was important for the students to pass this course, for themselves and for personal reasons. If they did not pass, DSTO would probably not pay for the courses of the students anymore.

Comfortable with learning

According to the lecturer and the students, the lecturer made the students feel comfortable with learning, by making sure that they could ask questions via e-mail, phone or in the workshops. The lecturer phoned with the online students and according to the students he was very approachable.

The lecturer was trying to make the students feel comfortable with learning, by explaining every little detail, particularly for individual assignments. For each assignment there was a sheet with information and what small steps to do. The lecturer also provided a template and grading points for assignments. The students could choose the topic of the first big assignment, which interested them or was relevant for their work. They could ask the lecturer if it was a good subject before they started researching it.

Motivation

The students said it was sometimes difficult to motivate themselves, because they were very busy with work and things at home, or because the subject of the course was not what they wanted. The students tried to get motivated by just planning it in their agenda, or by doing it on the last night before the assignment was due.

Level of the content

Most students said that the content of the course fit with their basic knowledge. That was also because the lecturer provided some chapters of a book online, to make sure everyone had the right preliminary knowledge. Some students said the content of the course did not really fit with their work background; they used the content more as background information.

Assignments

Some students thought the assignments were at reasonable level and that the tutorials were good and relevant to the subject. Some students said that it was not really clear to them what was expected from the assignments. Some students thought that the assignments had the wrong topic.

Workload

All students said the workload was good.

Interaction facilities

Some students said the course did not encourage and facilitate opportunities to interact with fellow students. Some students added that in their group there was no real introduction to each other, so that was not helping with interacting.

Some students and the lecturer said the course did encourage and facilitate opportunities to interact with fellow students by the way it had been planned in tutorial groups. It helped for these students to know backgrounds of other students, not only for the course, but also for business purposes. The course offered facilities by giving e-mail addresses and seeing faces of other people in workshops, but still the students had to take action themselves.

All students and the lecturer mentioned the opportunities the website provided for interaction: a discussion forum, a notice board and the use of e-mail and phone for interaction. Students were not using the discussion board a lot, because the lecture notes and assignments were clear. But the students thought it was important to have a discussion board on the website, in case someone did have a question.

Group work

Most students did not like the group work, they did not learn a lot from fellow students. Some students thought group work was important and they learned a lot from their fellow students. Reasons why they did not like group work were that they thought that their own work was better than the group-work, it was hard to coordinate to come together, and communication was not going right. Another reason why group-work did not go right was that the group-members were too busy with their work to have good discussions.

The students who did not like group work, liked to do teamwork, but in the culture as it was everyone rather did it individually. Everyone was a bit judgemental to each other.

Lectures

All students said the workshops were helping them with learning, because the material for this course needed clarification, and that could be done in the face-to-face meetings. The students preferred to have answers to their questions straight away, that was possible in the workshops.

Feedback

According to the students, feedback on assignments was clear, extensive and reasonably timely. Students could do the assignments without knowing the feedback on the prior assignment, but they would rather have had the feedback before they submitted the next assignment, because students did not know if they were on the right track.

The lecturer added to this that students could get feedback on their working plan. When the students got their assignment back, a summary of the feedback was submitted in the e-mail, more detailed feedback was put in the assignment. The lecturer tried to explain why the students were doing something wrong or why it was good.

Materials

All students and the lecturer said the materials were easy to reach. Everything was on the website, provided by the lecturer. There were articles and readings, and PowerPoint slides. These slides were practical, not only theoretical. Some students added to that that sometimes they could not view the materials. They did not know who to contact then.

Some students said that as online student it was easy to get material, but you did not know what to expect the next weeks. That was difficult.

Knowledge of the lecturer

Most students said the lecturer had sufficient knowledge, because he could explain the theory in several ways and the lecturer used a lot of real life examples. Some students thought the lecturer had enough real life experience, but he was not theoretical and scientific enough.

Guidance from the lecturer

All students and the lecturer said there was enough guidance from the lecturer when there was a problem or a question. Students could ring him up, e-mail him or ask questions in the workshop. Students had to ask the lecturer for help themselves.

Motivation by the lecturer

According to the students and the lecturer, he could motivate the students by organizing the workshops, by giving all the feedback and by taking them serious. They were encouraged by his humour and examples in the lectures. The lecturer told all the information about OTE and he then made them think about the content. Students could ask questions and get an answer to their questions, which was motivating. The course was provided in steps; that was motivating too.

Personal background and the lecturer

The students thought that the lecturer knew only in what background they worked (defence) and that they all had a certain level, otherwise they could not do this course. Most students said it would be helpful if the lecturer knew a little bit of their backgrounds, because that would help with explaining and using examples. Some students said it was not really important that the lecturer knew this. Maybe it would help with group work, if students knew each others background.

According to the lecturer no time was spent in the course on introducing the students. They could put contact information on the website, on the discussion board, but students did not do this. The lecturer knew some students from other courses. In the first workshop every face-to-face student had to introduce him-/herself.

Examples used

The students could all relate to the topics the lecturer used, because he used a lot of pictures and examples. The lecturer explained where it fit in the big picture.

Learning styles

All students said they worked mostly in the same way: reading, making assignments and discussing it with group members. This is because the course was organized that way.

All students said they learned a lot from reading. Some student mentioned that in group work they were interacting, but to give this meaning they should meet. Some students said they would learn most from a variety of teaching methods.

The lecturer adds that there was variation in the assessment climate, because there were different kinds of assignments.

Teaching methods

Some students said there was enough variation in the way the lecturer presented the content of the course, the students learned from reading the lecture notes. Most students said there was not a huge variation in the way the content was presented. The lecturer used PowerPoint slides for the lectures, video and case studies. They thought a variation would be important. The lectures were helpful, because students could ask questions and got instant feedback.

There were now three workshops, probably a fourth one was coming and that would be enough for some students. Perhaps the first workshop should be earlier.

Some students preferred more meetings, because then they could meet and interact with each other and they thought this was very important.

According to the lecturer there was variation, because of the responses and questions of the students.

Sub-conclusions

In general, the students and the lecturer agreed. The major comment of the students was that the course needs more variation in the way it presents the material. Online students would like

to have face-to-face classroom sessions. Students would like to know each others background. The students were satisfied with the way they received feedback.

Appendix 6: Recommendations

This appendix will mentioned the actual recommendations that were used in the evaluation of the recommendations-phase. There were recommendations with respect to interaction, with respect to interaction (teaching) methods, with respect to feedback, with respect to assignments and some general recommendations. Each recommendation is numbered.

Recommendations with respect to interaction

This section will discuss three recommendations about improving interaction between the students and between the students and the lecturer of the RMME course.

Recommendations

1. It is advised that the lecturer creates a place on the discussion board where students have to submit their personal background information (picture and approximately ten sentences). This is one of the folders in the structure of the discussion board. The lecturer should encourage all students to submit this (he can make it compulsory). It is up to the students to read the background information of other students.
2. It is advised that the lecturer calls the online students at least one time during the course. This way the online students have real-human interaction, they can ask questions and get instant feedback. This motivates them.
3. It is advised that the lecturer uses the students' background information in the material, so that especially the online students can relate to it.

Recommendations with respect to interaction (teaching) methods

This section will discuss eleven interaction (teaching) methods that will help improve the RMME course.

4. It is advised that the lecturer stimulates the students to use the discussion board by the following ways:
 - Submitting general feedback on the discussion board.
 - Submitting relevant questions asked by one student on the discussion board.
 - When a student places a question on the discussion board, it is advised that the lecturer also gives the other students opportunities to answer that question. This way the lecturer lets the students think for themselves.
 - It is advised that the lecturer respond to the answers given by the students, this way the students know what answers are good and what not.
5. It is advised to structure the discussion board by lesson. Questions relevant for lesson 1, should be submitted under folder 'lesson 1'. This way the students will not get 'lost' in the discussion board.
6. It is advised that all students and the lecturer receive an e-mail when something has been submitted on the discussion board.
7. It is advised to keep the notice board up-to-date.
8. It is advised to submit the newest information on top of the notice board.
9. It is advised to make use of online practice exercises
10. It is advised to make use of hyperlinks in an e-learning environment.
11. It is advised to make use of interactive animations and media can be useful.

12. It is advised to make use of simulations, especially role-play and case studies.
13. It is advised to make use of recorded lectures in an e-learning environment.
14. It is advised to make use of a live virtual classroom, because it improves the e-learning environment.
15. It is advised to make use of chat sessions in an e-learning environment.
16. It is advised to make use of PowerPoint slides with pictures, graphics and diagrams.
17. It is advised to make use of classroom discussions.
18. It is advised that at the beginning of each course some time is spent on how to work effectively in groups. The students should encourage and stimulate each other in the group to have meaningful discussion. The atmosphere should be one in which the students want to learn from each other and share experiences.
19. It is advised to submit a document in the e-learning environment of how to work effectively in groups. Every student has access to this document.
20. It is advised that the lecturer stimulates group-work, by showing interest in how the group-work is progressing.
21. It is advised that at the end of working in groups in course, the students write a reflection paper of 2/3 pages about how the group-work went:
 - Positive points
 - Negative points
 - How come it was positive or negative (explanation)
 - How can the negative points be improved
 - Learning points

It is recommended that the reflection paper will not be marked, but it is compulsory. This way the students do not think they are writing a reflection paper for nothing and they will take it serious.

Recommendations with respect to feedback

This section will discuss recommendations about improving feedback for the RMME course.

Recommendations

22. It is advised to answer e-mails or phone calls within 3 days.
23. It is advised to mark assignments within 3 weeks.
24. It is advised that the feedback is constructive.
25. It is advised that every student receives personalized feedback on their assignments.
26. It is advised that general feedback is submitted on the discussion board.

Recommendations with respect to assignments

This section will discuss recommendations about improving the assignments for the RMME course.

Recommendations

27. It is advised that the written material is more explicit as to what steps need to be taken to complete the assignments.
28. It is advised that the lecturer submits extra information concerning the assignments on the discussion board, especially when in the face-to-face classroom sessions there have been several questions about the assignment.

General recommendations

In this section some general recommendations are discussed, that are usable in both the RMME and OTE course, but usable in other courses as well.

A. Course explanation

Recommendations

29. It is advised to submit more detailed course information on the universities website.

B. E-learning environment

Recommendations

30. It is advised to put the buttons in the same order.

31. It is advised to use the same format for the course outline.

C. Delivery environment

Recommendations

32. The students of the OTE course would like to have more face-to-face meetings, because then they can meet and interact with each other.

D. Access e-learning environment

Recommendations

33. It is advised that the lecturer send all the students an e-mail at the beginning of the course to check if the students can log-in and if they have problems with this, who they can contact.

E. Delivery of learning material

Recommendations

34. It is advised to deliver the learning material two lessons ahead. This way the students can plan their learning better into their work schedule, but cannot work too much ahead.

Appendix 7: Results research question 2 RMME

In this appendix the results will be presented that answers the questions: ‘How can the quality of the blended learning environment of the RMME course of the LMEF Masters program be improved by looking at the degree in which the course offers students different interaction methods?’

After drawing conclusions and writing recommendations based upon the evaluation phase, a formative evaluation was conducted with the lecturers and students to evaluate what they thought of the recommendations. The recommendations must be effective, efficient, interesting and motivating, practical and usable and acceptable (Tessmer, 2001) (See chapter 3). These criteria were checked with the students and lecturers by doing this formative evaluation.

The primary goal of this formative evaluation was to improve the quality of the blended learning environment of the RMME course of the LMEF Masters program, by looking at the degree in which the courses offer adult learners with different learning styles, different interaction methods.

Below, the result of this formative evaluation will be presented. When there is spoken about some students, this means that this could be 2 students or less. When there is spoken about most students, this means 3 students or more.

The written recommendations are combined with the results of the evaluation phase from Klink (2006).

Results formative evaluation

The first course that was analysed was the RMME course of the LMEF Masters program. In this section the results of the formative evaluation will be presented.

Recommendations

As a result of chapter 4, different recommendations were written to improve the quality of the RMME course. The recommendations cover different topics:

- Interaction
- Interaction (teaching) methods
- Feedback
- Assignments
- General recommendations

Recommendations with respect to interaction

This section will discuss three recommendations about improving interaction between the students and between the students and the lecturer of the RMME course.

Recommendations

35. It is advised that the lecturer creates a place on the discussion board where students have to submit their personal background information (picture and approximately ten sentences). This is one of the folders in the structure of the discussion board. The lecturer should encourage all students to submit this (he can make it compulsory). It is up to the students to read the background information of other students.

According to some students, the recommendation about submitting personal backgrounds were not efficient; it would cost them more time. According to some students, this recommendation was not acceptable, because some students might be too embarrassed or feel uncomfortable to place their picture on the course website. Some students thought this would be effective, interesting and motivating. According to the lecturer it would especially work at the beginning of the course.

- It is advised that the lecturer calls the online students at least one time during the course. This way the online students have real-human interaction, they can ask questions and get instant feedback. This motivates them.

All the students and the lecturer thought this recommendation was usable and acceptable.

- It is advised that the lecturer uses the students' background information in the material, so that especially the online students can relate to it.

The online students thought this recommendation was not particularly practical, unless all of the students had very similar backgrounds. The face-to-face students and the lecturer thought this recommendation was motivating and effective.

Recommendations with respect to interaction (teaching) methods

This section will discuss eleven interaction (teaching) methods that will help improve the RMME course.

Discussion board in an e-learning environment

Recommendations

- It is advised that the lecturer stimulates the students to use the discussion board by the following ways:
 - Submitting general feedback on the discussion board.
 - Submitting relevant questions asked by one student on the discussion board.
 - When a student places a question on the discussion board, it is advised that the lecturer also gives the other students opportunities to answer that question. This way the lecturer lets the students think for themselves.
 - It is advised that the lecturer respond to the answers given by the students, this way the students know what answers are good and what not.

Some students would not like it if students tell each other what to do. Most students thought this recommendation would be motivating, usable, efficient and acceptable.

According to the lecturer, the points were good, but the last point would probably cost him much extra time, so it would be less efficient for him.

- It is advised to structure the discussion board by lesson. Questions relevant for lesson 1, should be submitted under folder 'lesson 1'. This way the students will not get 'lost' in the discussion board.

According to the online student, the discussion board only had about one page of messages; he could not see how anyone could get 'lost' in that. The face-to-face students and the lecturer thought this recommendation would be acceptable and very usable.

- It is advised that all students and the lecturer receive an e-mail when something has been submitted on the discussion board.

The online student disagreed with this recommendation. 'For a discussion board to be effective, it needs to be part of how the student relates to the course.' The face-to-face

students and the lecturer mentioned that this recommendation was acceptable, but it depended on how much was submitted on the discussion board. They then preferred to receive an e-mail once a day that tells the students there are new topic/questions/answers submitted on the discussion board.

Notice board in an e-learning environment

Recommendations

- It is advised to keep the notice board up-to-date.

Some students mentioned they would also like to receive an email when something new was submitted on the notice board. Most students thought this would be effective, efficient, motivating, usable and acceptable.

According to the lecturer, he wanted to submit something on the notice board every week.

- It is advised to submit the newest information on top of the notice board.

According to all students, it was important to put newest information on top, to make it efficient and that way time saving.

The lecturer said he already did this; he also found this important.

Online practice exercises

- It is advised to make use of online practice exercises

Some students mentioned they would also do the practice exercises when it was voluntary, when they had the time. According to some students, it would help the learning, but it should be marked. Most students and the lecturer thought the use of online practice exercises would be motivating and interesting, effective, efficient, usable and acceptable.

Hyperlinks

- It is advised to make use of hyperlinks in an e-learning environment.

According to all the students and the lecturer, hyperlinks would be effective, motivating, usable and acceptable, as long as there would not be too much.

Interactive animations and media

- It is advised to make use of interactive animations and media can be useful.

Some students could imagine that interactive animations would be used in the RMME course. According to some students, it could be useful for picking samples of a population. Most students thought the recommendation would be effective, efficient, interesting and motivating, usable and acceptable.

According to the lecturer, they could be usable and motivating, but because of the time somebody else should design them for him.

Simulations: Role-play & Case-study

- It is advised to make use of simulations, especially role-play and case studies.

The online student thought the use of simulations would not be efficient and usable. The face-to-face students and the lecturer thought simulations would be effective, efficient, interesting and motivating, usable and acceptable.

Recorded lectures

- It is advised to make use of recorded lectures in an e-learning environment.

Some students mentioned that the recorded lectures should be short. They did not prefer to have recorded lectures of 1 hour. Most students and the lecturer thought this recommendation

would be effective, efficient, interesting and motivating, usable and acceptable. According to the interviewed students, this recommendation would be especially helpful for online students.

Live virtual classroom

- It is advised to make use of a live virtual classroom, because it improves the e-learning environment.

According to some students, the use of a live virtual classroom would be a good option for the online students, but it would be expensive. Most students thought the use of a live virtual classroom would be effective, interesting and motivating, usable and acceptable.

According to the lecturer, live virtual classrooms would be good to use two times in a course, especially for the online students.

Chat session

- It is advised to make use of chat sessions in an e-learning environment.

Most students would not use a chat session; it would not be effective, efficient, interesting or motivating, usable or acceptable. They preferred to use the phone, instead of a chat session. The online student would like the use of a chat session.

According to the lecturer, this would be possible; he could schedule half an hour a week in his personal agenda.

PowerPoint slides with pictures, graphics and diagrams

- It is advised to make use of PowerPoint slides with pictures, graphics and diagrams.

According to some students, the more pictures and the less bullet-points the better.

According to most students, this recommendation would be effective, efficient, interesting and motivating, usable and acceptable.

The lecturer liked to use PowerPoint slides with pictures, graphics and diagrams more often.

It would be time consuming to change this, but according to him, it would be worthwhile.

Classroom Discussions

- It is advised to make use of classroom discussions.

It would be effective, efficient, interesting and motivating, usable and acceptable. According to all students and the lecturer, classroom discussions would be very important, because one can hear somebody else's opinion.

Group-work

Recommendations

- It is advised that at the beginning of each course some time is spent on how to work effectively in groups. The students should encourage and stimulate each other in the group to have meaningful discussion. The atmosphere should be one in which the students want to learn from each other and share experiences.

Some students did not prefer this, because the teaching time could be used better. Some students doubt if people follow the 'rules' for group work. They would not like group work to be marked. They would rather work individual. Most students and the lecturer thought this recommendation would be effective, efficient, interesting and motivating, usable and acceptable.

- It is advised to submit a document in the e-learning environment of how to work effectively in groups. Every student has access to this document.

All the students and the lecturer thought this would be effective, efficient, interesting and motivating, usable and acceptable.

- It is advised that the lecturer stimulates group-work, by showing interest in how the group-work is progressing.

According to some students, the lecturer already showed interest in how the group-work was progressing. Most students and the lecturer thought this would be effective, efficient, interesting and motivating, usable and acceptable.

- It is advised that at the end of working in groups in course, the students write a reflection paper of 2/3 pages about how the group-work went:
 - Positive points
 - Negative points
 - How come it was positive or negative (explanation)
 - How can the negative points be improved
 - Learning points

It is recommended that the reflection paper will not be marked, but it is compulsory. This way the students do not think they are writing a reflection paper for nothing and they will take it serious.

According to some students, reflection would be useful, but should not be marked.

Some interviewed students would only write a reflection paper when it would be marked.

Some students were concerned about the time it would take them to write a reflection paper.

Some students thought this recommendation would be effective, efficient, interesting and motivating, usable and acceptable.

According to the lecturer, reflection would be good, as long as he would not have to mark it. That would cost him too much time and that is not efficient.

Recommendations with respect to feedback

This section will discuss recommendations about improving feedback for the RMME course.

Recommendations

- It is advised to answer e-mails or phone calls within 3 days.
- It is advised to mark assignments within 3 weeks.
- It is advised that the feedback is constructive.
- It is advised that every student receives personalized feedback on their assignments.
- It is advised that general feedback is submitted on the discussion board.

According to all the students and the lecturer, these were good recommendations, because they would be effective, efficient, interesting and motivating, usable and acceptable.

According to some students, it would even be better when the students received feedback on their assignments before the next face-to-face classroom session.

The lecturer mentioned that 3 days should be changed into 3 business days.

Recommendations with respect to assignments

This section will discuss recommendations about improving the assignments for the RMME course.

Recommendations

- It is advised that the written material is more explicit as to what steps need to be taken to complete the assignments.

- It is advised that the lecturer submits extra information concerning the assignments on the discussion board, especially when in the face-to-face classroom sessions there have been several questions about the assignment.

According to all the students and the lecturer, it would be effective, efficient, interesting and motivating, usable and acceptable; these were good recommendations.

Some students mentioned that it would be good to put questions asked in face-to-face classroom session on the discussion board, as long as there is no name attached of the person who asked the question.

General recommendations

In this section some general recommendations are discussed, that are usable in both the RMME and OTE course, but usable in other courses as well.

A. Course explanation

Recommendations

- It is advised to submit more detailed course information on the universities website.

According to all the students and the lecturer, this was a good recommendation; it would be effective, efficient, interesting and motivating, usable and acceptable.

B. E-learning environment

Recommendations

- It is advised to put the buttons in the same order.
- It is advised to use the same format for the course outline.

According to all the students and the lecturer, it would be effective, efficient, interesting and motivating, usable and acceptable; these were good recommendations.

C. Delivery environment

Recommendations

- The students of the OTE course would like to have more face-to-face meetings, because then they can meet and interact with each other.

According to most students and the lecturer, there were enough face-to-face meetings in the RMME course. This recommendation would not be really usable for the face-to-face students.

According to the online student, a course should be offered online or offline, not a combination of both.

D. Access e-learning environment

Recommendations

- It is advised that the lecturer send all the students an e-mail at the beginning of the course to check if the students can log-in and if they have problems with this, who they can contact.

According to all the students and the lecturer, it would be effective, efficient, interesting and motivating, usable and acceptable; this was a good recommendation.

E. Delivery of learning material

Recommendations

- It is advised to deliver the learning material two lessons ahead. This way the students can plan their learning better into their work schedule, but cannot work too much ahead.

According to some students, learning materials should not be delivered more than two weeks ahead. According to some students, one lesson ahead would already be good.

According to most students and the lecturer, it would be effective, efficient, interesting and motivating, usable and acceptable; this was a good recommendation.

Preferences for recommendations

In this formative evaluation, the interviewed students and the interviewed lecturer were asked which recommendations they liked the most and which ones they did not like. These results are presented below.

Recommendation the students and lecturer liked the most

During the formative evaluation the students were also asked to mention the recommendations they liked the most. The following recommendations are recommendations that the students and the lecturer liked the most, because they were interesting and motivating, effective, practical and usable and acceptable.

Students:

Recommendations about the interaction (teaching methods):

- More variation in the way the material is delivered; mentioned five times.
- Use of simulations: role-play and case study; mentioned one time
- Group-work:
 - It is advised that the lecturer stimulates group-work, by showing interest in how the group-work is progressing; mentioned one time.
- Discussion board:
 - It is advised that the lecturer stimulates the students to use the discussion board; mentioned two times:
 - Submitting general feedback on the discussion board.
 - Submitting relevant questions asked by one student on the discussion board.
 - When a student places a question on the discussion board, it is advised that the lecturer also gives the other students opportunities to answer that question. This way the lecturer lets the students think for them selves.
 - It is advised that the lecturer respond to the answers given by the students, this way the students know what answers are good and what not.

Recommendations about feedback; mentioned three times:

- It is advised to answer e-mails or phone calls within 3 days.
- It is advised to mark assignments within 3 weeks.
- It is advised that the feedback is constructive.
- It is advised that every student receives personalized feedback on their assignments.
- It is advised that general feedback is submitted on the discussion board.

Recommendation about the assignments:

- It is advised that the lecturer submits extra information concerning the assignments on the discussion board, especially when in the face-to-face classroom sessions there have been several questions about the assignment; mentioned one time.
- It is advised that the written material is more explicit as to what steps need to be taken to complete the assignments; mentioned two times.

Lecturer:

Recommendations about the interaction (teaching methods):

- More live, online things. Especially the use of a live virtual classroom for a couple of sessions.

Recommendation the students and lecturer did not like

During the formative evaluation the students were also asked to mention the recommendations they did not like. The following recommendations are ones that the students and the lecturer did not like, because they were not interesting or motivating, effective, practical or usable or acceptable.

Students:

Recommendations about the interaction (teaching) methods:

- Use of chat session: In the workplace is phone better, this is quicker according to the students; mentioned two times.
- If the group-work will be marked, one of the students would not like this.

Recommendations about group-work (reflection paper):

- It is advised that at the end of working in groups in the course, the students write a reflection paper of 2/3 pages about how the group-work went; mentioned one time.

Recommendations about the discussion board:

- It is advised that all students and the lecturer receive an e-mail when something has been submitted on the discussion board; mentioned one time.

Lecturer:

According to the lecturer, all the recommendations would work, but some are harder to do because of time and/or money.

Appendix 8: Results research question 2 OTE

In this appendix the results will be presented that answers the questions: ‘How can the quality of the blended learning environment of the OTE course of the LMEF Masters program be improved by looking at the degree in which the course offers students different interaction methods?’

After drawing conclusions and writing recommendations based upon the evaluation phase, a formative evaluation was conducted with the lecturers and students to evaluate what they thought of the recommendations. The recommendations must be effective, efficient, interesting and motivating, practical and usable and acceptable (Tessmer, 2001) (See chapter 3). These criteria were checked with the students and lecturers by doing this formative evaluation.

The primary goal of this formative evaluation was to improve the quality of the blended learning environment of the OTE course of the LMEF Masters program, by looking at the degree in which the courses offer adult learners with different learning styles, different interaction methods.

Below, the result of this formative evaluation will be presented. When there is spoken about some students, this means that this could be 2 students or less. When there is spoken about most students, this means 3 students or more.

The written recommendations are combined with the results of the evaluation phase from Klink (2006).

Results formative evaluation

The second course that was analysed was the OTE course of the LMEF Masters program. In this section the results of the formative evaluation will be presented.

Recommendations

As a result of chapter 5, different recommendations were written to improve the quality of the OTE course. The recommendations cover different topics:

- Interaction
- Interaction (teaching) methods
- Feedback
- Assignments
- General recommendations.

Recommendations with respect to interaction

This section will discuss three recommendations about improving interaction between the students and between the students and the lecturer of the OTE course.

Recommendations

- It is advised that the lecturer creates a place on the discussion board where students have to submit their personal background information (picture and approximately ten sentences). This is one of the folders in the structure of the discussion board. The lecturer should encourage all students to submit this (he can make it compulsory). It is up to the students to read the background information of other students.

Most students said this recommendation would be effective, efficient, interesting and motivating, usable and acceptable. Some students said they did not know if it would be very practical. The lecturer was willing to do this. He was wondering if students would do this.

- It is advised that the lecturer calls the online students at least one time during the course. This way the online students have real-human interaction, they can ask questions and get instant feedback. This motivates them.

All the students said this would be effective, efficient, interesting and motivating, usable and acceptable. Some students mentioned that it would not be necessary for all subjects. The lecturer thought this was important too. According to him, he was doing this already.

- It is advised that the lecturer uses the students' background information in the material, so that especially the online students can relate to it. The lecturer can use this information while explaining and using in examples.

Most students and the lecturer said this would be effective, efficient, interesting and motivating, usable and acceptable. Some students were wondering about the usability of this recommendation. The lecturer was willing to do this.

Recommendations with respect to interaction (teaching) methods

This section will discuss eleven interaction (teaching) methods that will help improve the OTE course.

Discussion board in an e-learning environment

Recommendations

- It is advised that the lecturer stimulates the students to use the discussion board by the following ways:
 - Submitting general feedback on the discussion board.
 - Submitting relevant questions asked by one student on the discussion board.
 - When a student places a question on the discussion board, it is advised that the lecturer also gives the other students opportunities to answer that question. This way the lecturer lets the students think for themselves.
 - It is advised that the lecturer respond to the answers given by the students, this way the students know what answers are good and what not.

All the students thought these recommendations would help stimulate the use of the discussion board. It would be effective, interesting and motivating and acceptable. Some students doubt if every student would submit their information, they were not sure about the usability of this recommendation. Some students said that using the discussion board takes a long time; they would rather directly call the lecturer. So, this would not be efficient for them.

The lecturer said he was doing this already. He was afraid it would backfire if he puts questions on the discussion board, students will be afraid to e-mail questions, even when their questions are submitted anonymous on the discussion board. But he thought the recommendation would be effective, efficient, motivating and usable.

- It is advised to structure the discussion board by lesson. Questions relevant for lesson 1 should be submitted under folder 'lesson 1'. This way the students will not get 'lost' in the discussion board.

All the students said this recommendation would be effective, efficient, interesting and motivating, usable and acceptable.

The lecturer thought it was a good idea to structure the discussion board, especially when students use it more. He was not sure how to do that, and if it was possible for him to do that.

- It is advised that all students and the lecturer receive an e-mail when something has been submitted on the discussion board.

All the students would like to receive an e-mail as a reminder to look at the discussion board, that would be motivating, usable and efficient for them. Some students would like to have the opportunity for every student to choose for themselves if they want an e-mail once a day, once a week or immediately. Some students preferred to have the e-mail at the end of the day. Some students also suggested sending an e-mail with a few lines and a direct link to the discussion page. According to the lecturer, each student had to select that option already in the discussion board. They could only choose if they wanted to have an e-mail directly, or getting no e-mail.

Online practice exercises

- It is advised to make use of online practice exercises

Most students and the lecturer thought online practice exercises would be effective, efficient, interesting and motivating, usable and acceptable. The exercises have to be short, informal, not marked and they should fit with the content of the course. Some students want to have informal feedback on the exercise, so it would help them with learning.

Hyperlinks

- It is advised to make use of hyperlinks in an e-learning environment.

All the students said this would be effective, efficient, interesting and motivating, usable and acceptable. It should be linked to something relevant for this course.

The lecturer used pdf files. According to him, it was not possible to use hyperlinks in a pdf file. So, to use this pdf files he could make a webpage with hyperlinks to the pdf files.

Interactive animations and media

- It is advised to make use of interactive animations and media can be useful.

Most students did not think interactive animations would be effective in this course; it would not fit with the content. Some students said it depended on what the animations were.

The lecturer could not see where it would fit, so it would not be effective for him. Another concern was the downloading time. Interactive animations could take a lot of downloading time; this would not be efficient and usable.

Simulations: Role-play & Case-study

- It is advised to make use of simulations, especially role-play and case studies.

Most students said case studies would be effective, efficient, interesting and motivating, usable and acceptable. Some students did not think role-plays would be effective for this course. Some students did not like the extra work, and they were wondering about the use for an online student.

The lecturer liked doing the case studies, but he could use them more.

Recorded lectures

- It is advised to make use of recorded lectures in an e-learning environment.

All students said that the lecture notes were good enough, when in the lesson something was added. But, the benefit of recorded lectures is that one can rewind and listen again. It could be hard to listen for an hour, so the recorded lecture should be in pieces of 15/20 minutes.

They all agreed that this would be really effective for online students or students who could not attend the meeting.

The lecturer said he was already using one recorded audio lectures, since the middle of the course.

Live virtual classroom

- It is advised to make use of a live virtual classroom, because it improves the e-learning environment.

All the students said the use of live virtual classrooms would be effective, efficient, interesting and motivating, usable and acceptable for online students, not for students who could go to the workshops. Some students said it would be hard to get everyone online at the same time and having the facilities to do that. Some students mentioned that the technology should be working all right.

The lecturer did not like it very much, because technology is unreliable and it will take a lot of time for the lecturer and the students to prepare a live virtual classroom.

Chat session

- It is advised to make use of chat sessions in an e-learning environment.

Most students said it was not good to use a chat session, they saw some big problems with deciding on what time to do the chat session, and using the phone worked faster.

The lecturer did not see the benefit of putting a chat session in, because the students also did not use the discussion board.

PowerPoint slides with pictures, graphics and diagrams

- It is advised to make use of PowerPoint slides with pictures, graphics and diagrams.

This recommendation was not really effective, because most students said the PowerPoint slides were good as it was. Some students said more graphics could be added, if they were practical.

Classroom Discussions

- It is advised to make use of classroom discussions.

All the students and the lecturer thought it was effective, efficient, interesting and motivating, usable and acceptable; this was a good recommendation.

Group-work

Recommendations

- It is advised that at the beginning of each course some time is spend on how to work effectively in groups. The students should encourage and stimulate each other in the group to have meaningful discussion. The atmosphere should be one in which the students want to learn from each other and share experiences, not to be judged by other students. A sense of community will be produced.

Most students and the lecturer thought it was effective, efficient, interesting and motivating, usable and acceptable; this recommendation was a good idea.

- It is advised to submit a document in the e-learning environment of how to work effectively in groups. Every student has access to this document.

All the students thought this document should be provided in the course website, as part of the course. It would be effective, efficient, interesting and motivating, usable and acceptable. The lecturer thought that not a lot of students would read this document.

- It is advised that the lecturer stimulates group-work, by showing interest in how the group-work is progressing.

All the students thought this was a good recommendation; it would be effective, efficient, interesting and motivating, usable and acceptable. Some students added to this that it would be important that the lecturer would not always ask the same person in the group how the group-work is going. Some students added that the lecturer should have more attention to the way he puts groups together.

The lecturer thought the recommendation was a good idea.

- It is advised that at the end of working in groups in the course, the students write a reflection paper of 2/3 pages about how the group-work went:

- Positive points
- Negative points
- How come it was positive or negative (explanation)
- How can the negative points be improved
- Learning points

It is recommended that the reflection paper will not be marked, but that it is compulsory.

This way the students do not think they are writing a reflection paper for nothing and they will take it serious.

Most students and the lecturer thought a reflection paper was a good idea, as long as it was not marked and when it was short; 2 or 3 pages may be too long. The lecturer also thought this recommendation was a good idea.

Some students did not like writing a reflection paper. They saw it as extra work and 2 or 3 pages will be too much for them.

Recommendations with respect to the assignments

This section will discuss recommendations about improving the assignments for the OTE course.

Recommendations

- It is advised that the written material is more explicit as to what steps need to be taken to complete the assignments.

All the students agreed that the clearer the written material, the better. For some students the assignments were already clear. Some students mentioned that the assignments were already in steps, but people could not see where the assignments were related in the big picture.

The lecturer did not know how to make the assignments clearer.

- It is advised that the lecturer submits extra information concerning the assignments on the discussion board, especially when in the face-to-face classroom sessions there have been several questions about the assignment.

All the students thought this was a good idea. It would be effective, efficient, interesting and motivating, usable and acceptable. The lecturer was willing to do this.

General recommendations

In this section some general recommendations are discussed, that are usable in both the RMME and OTE course, but usable in other courses as well.

A. Course explanation

Recommendations

- It is advised to submit more detailed course information on the universities website.
- All the students and the lecturer agreed on this. Some students suggested that a list of the lessons and then the topic of each lesson should be mentioned. This would provide a view of how the course will go.*

The lecturer said the university did not want to put more information on.

B. E-learning environment

Recommendations

- It is advised to put the buttons in the same order.
- It is advised to use the same format for the course outline.

All the students agreed that it would be effective, efficient, usable and acceptable if everything was in the same order.

The lecturer used the template from the university. He would like to have a template for the format that everyone within SEEC could use.

C. Delivery environment

Recommendations

- The students of the OTE course would like to have more face-to-face meetings, because then they can meet and interact with each other.

All the students would like to have face-to-face education, so having more meetings was always good for them. The lecturer also liked to give face-to-face education rather than online. But he offered them workshops in his own time already.

D. Access e-learning environment

Recommendations

- It is advised that the lecturer send all the students an e-mail at the beginning of the course to check if the students can log-in and if they have problems with this, who they can contact.

All the students said the lecturer sent them an e-mail at the beginning of the course. But this e-mail could be send a little bit earlier. The lecturer said he was already doing this.

E. Delivery of learning material

Recommendations

- It is advised to deliver the learning material two lessons ahead. This way the students can plan their learning better into their work schedule, but cannot work too much ahead.

All the students agreed that having the material a little bit earlier would be easier sometimes for planning; it would be effective, efficient, usable and acceptable.

The lecturer was willing to do this.

Preferences for recommendations

In this formative evaluation, the interviewed students and the interviewed lecturer were asked which recommendations they liked the most and which ones they did not like. These results are presented below.

Recommendation the students and lecturer liked the most

During the formative evaluation the students were also asked to mention the recommendations they liked the most. The following recommendations are the ones that the

students and the lecturer liked the most, because they were interesting and motivating, effective, practical and usable and acceptable.

Students:

Interaction (teaching) methods

- Recommendations about group-work:
 - It is advised that at the beginning of each course some time is spent on how to work effectively in groups; mentioned three times.
- It is advised to make use of recorded lectures; mentioned one time.
- It is advised to make use of practice exercises; mentioned one time.

General recommendations

Recommendation about the delivery environment

- More face-to-face meetings; mentioned two times.

Recommendations about the delivery of learning materials

- It is advised to deliver the learning material two lessons ahead. This way the students can plan their learning better into their work schedule, but cannot work too much ahead; mentioned two times.

Interaction

- It is advised that the lecturer creates a place on the discussion board where students have to submit their personal background information (a picture and approximately ten sentences); mentioned one time.

Lecturer:

The lecturer mentioned the following recommendations as good recommendations:

- Reflection as a formal activity
- Providing clearer guidance

Recommendation the students and lecturer did not like

During the formative evaluation the students were also asked to mention the recommendations they did not like. The following recommendations are recommendations the students and the lecturer did not like, because they were not interesting and motivating, ineffective, unpractical or unusable and unacceptable.

Students:

Recommendations about the interaction (teaching) methods:

- Use of chat session: In the workplace using the phone works better; this is quicker according to the students; mentioned five times.
- Writing a reflection paper; mentioned one time.
- Using more pictures/diagrams in the PowerPoint slides, because that is already used; mentioned one time.

Lecturer:

The lecturer mentions the following recommendations as bad recommendations:

- Video taping him at a workshop; that is boring.
- Explain/doing more; there is a limit to.

Appendix 9: Implementation plan

Implementation Plan

RMME and OTE courses of the LMEF Masters program

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Date: November 2005*

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1 Introduction

SEEC has different masters programs. One of them is LMEF (a Masters of Engineering). The Department of Defence, division Defence Science and Technology Organisation (DSTO) is the client for the LMEF Masters. The Department of Defence has contracted an external organisation, AITEC, to administer the LMEF Masters program.

SEEC does a lot of work with them. DSTO invests a lot of money in the unit SEEC, so it is important to keep them satisfied by delivering high-quality courses. SEEC wants to ensure that the LMEF Masters program is representative of best practice in post graduate education, and, that the program is meeting the needs of the client. The two LMEF courses running were 'Research Methods in a Multidisciplinary Environment' (RMME) and 'Operational Test and Evaluation' (OTE). Therefore, these two courses were evaluated.

Goal

This research project was aiming at improving the quality of the blended learning environment of the RMME and OTE courses of the LMEF Masters program by looking at the degree in which the courses offered adult learners with different learning styles, different interaction methods.

Another important reason to conduct this research was that there has never been a research about the way of teaching and cope with the different learning styles of adults, the lecturers do not have the proof that they are doing a good job. Through this research they can demonstrate to other people and organisations that they are taking the different adult learning styles into account and adjust the interaction method in the blended learning environment in the best possible way.

The students from the RMME course were all adults working at DSTO. Students from the OTE course were all adults working for DSTO and Tenix, a locally-owned defence and technology contractor.

In this research project, there were two phases: an evaluation phase and a phase that leads towards recommendations. In these phases, the focus for the activities was on interaction methods in a blended learning environment and the use of learning styles in adult learning. The different activities undertaken in the evaluation phase are:

- an analysis of the course websites
- an analysis of the results of the AITEC questionnaire 2003 for both courses
- an analysis of the results of the AITEC questionnaire 2004 for both courses
- an analysis of the results of the developed questionnaire for both courses
- interviews with students of the RMME and OTE course
- interviews with the lecturers of the RMME and OTE course

On grounds of the results of both phases, the preceding implementation plan has been written: The results of the evaluation phase led to writing recommendations for improving the RMME and OTE course. In the phase that led towards the recommendations, a formative evaluation was conducted, to see what the students and the lecturer thought of the suggested recommendations. After that formative evaluation, recommendations were re-written when necessary.

Reading guide

In chapter two, one can read the conclusions of the research project, immediately followed by the suggested recommendations that were based upon these conclusions. Unless mentioned else, the recommendations are for both courses. In chapter 3 a planning for all the

recommendations is suggested. A distinction is made between a planning while the course is running, a short term planning and a long term planning. In chapter 4 the costs related to implementing the suggested recommendations are presented. Finally, in chapter 5, some risks that can determine the succeeding of the suggested recommendations are presented.

2 Conclusions and recommendations

In this chapter the conclusions drawn from the several activities undertaken in the evaluation phase and the phase that leads towards recommendations are presented. After these results, the belonging suggested recommendations and an explanation of them are presented. For some recommendations there are further readings provided.

If one wants to see from which activities and literature sources the recommendations are drawn, a reference is made to the associated research reports of Chantal Scholten and Marieke Klink.

The recommendations cover different topics. In total there were thirty-four recommendations. That were recommendations about interaction, interaction (teaching) methods, feedback, assignments and general recommendations.

In section 2.1 three recommendations about interaction will be presented, in section 2.2 thirteen interaction (teaching) methods will be presented, and in section 2.3 more general recommendations that could be used to improve other courses than the RMME and OTE course are presented.

2.1 Recommendations with respect to interaction

This section will discuss three recommendations with respect to improving interaction between the students and between the students and the lecturer of the RMME and OTE course.

Results evaluation phase and the phase towards recommendations

For online students there were not enough possibilities to interact with other students. Online students also missed interaction with the lecturer. This way the online students did not get the guidance they preferred to have. Another result was that students did not feel comfortable with learning, because students did not know each other and they did not know the other students with whom they were working in the groups. The lecturer also did not know the personal backgrounds of the students.

Recommendations

a) It is advised that the lecturer makes at the beginning of the course a place on the discussion board where students have to submit their personal background information.

The personal background information can consist of:

- a picture of themselves;
- information about their work situation at this moment;
- their work history;
- their educational background; and
- a short description of their personal life situation, like if they are married, have kids and their hobby's.

In total this information should not be more than a half A4-page.

It is advised to submit this background information in a separate folder on the discussion board (one can read more about using a folder structure in the discussion board paragraph further on in this document). The lecturer should encourage all students to submit this, he should make it compulsory. It is up to the students to read the background information of

other students, it is not compulsory. The students, who would like to do this, have the possibility now.

The lecturer can stimulate the students to make more and better use of the discussion board, by making it clear to them at the beginning of the course that they can improve their grade by participating active on the discussion board. When they submit their background information and a picture of themselves on the discussion board, this will be 1% of their grade. By giving the students a grade for their participation they are more willing and motivated to do it.

b) It is advised that the lecturer calls the online students at least one time during the course.

This way the online students have real-human interaction, they can ask questions and get instant feedback. This motivates them.

c) It is advised that the lecturer uses the students' background information in the material, so that especially the online students can relate to it.

This is something that the online students are lacking right now. The students' background information can be used in the material, by using examples in the lessons that are related to this background or by using for example case studies that are related to the students' background.

2.2 Recommendation with respect to interaction (teaching) methods

This section will discuss eleven interaction (teaching) methods that will help improve the RMME and OTE course.

Meeting the different learning styles of the students can be done in different ways. The students will be able to obtain the same information by means of several formats and manners and the student will be able to get an answer to questions that are important for him/her, independently of time, location, place and learning style preferences. These different ways will be discussed in section 2.1 until section 2.13.

2.2.1 Discussion board in an e-learning environment

Results evaluation phase and the phase towards recommendations

The RMME and OTE course made use of a discussion board. It was clear that the discussion board was not used very much. Reasons for this were that submitting questions/answers on the discussion board took more time than using for instance the phone. Another reason was that the students did not know the other students, so it was uncomfortable for them to ask questions to a stranger.

The students preferred the use of a discussion board, because they could ask questions there and other students/the lecturer could answer their questions. For the online student the use of the discussion board was very important, because they did not have contact hours to ask their question in.

According to the literature, a discussion board is also very important, because it can be used for 'asynchronous' communication between lecturers and students. Online discussion provides an 'anywhere, anytime' learning environment which facilitates communication (University of South Australia, 2005).

Recommendations

- a) ***It is advised that the lecturer stimulates the students to use the discussion board by:***
- ***Submitting general feedback on the discussion board*** (one can read more about feedback in the feedback paragraph further on in this document).
 - ***Submitting relevant questions, asked by one student via for example e-mail or in the face-to-face meetings, on the discussion board.***
This way all students can read the question and the answer given to it. Especially for online students who cannot go to the face-to-face meetings this can be very helpful.
 - ***When a student places a question on the discussion board, it is advised that the lecturer also gives the other students opportunities to answer that question.***
This way the lecturer lets the students think for themselves, and not give them all answers straight away without letting them think about the subject.
 - ***It is advised that the lecturer respond after a couple of days (for example at the end of the week) to the answers given by the student.***
This way the students know what answers are good and what not.

The lecturer can stimulate the students to make more and better use of the discussion board, by making it clear to them at the beginning of the course that they can improve their grade by participating active on the discussion board. When they submit good and relevant questions and also give good comments on other questions, this will be 2% of their grade. By giving the students a grade for their participation they are more willing and motivated to do it.

b) ***It is advised to structure the discussion board by lesson.***

Questions relevant for lesson 1 should be submitted under folder 'lesson 1'. This way the students will not get 'lost' in the discussion board. They can go directly to the lesson in which they have a question, or for which they want to read an answer. They do not have to read a lot of pages with other questions first.

It is also advised to make the structure in such a way that when a reaction to a question is submitted, this reaction comes under the question. This way it is clear what the questions are and what the reactions to these questions are.

This recommendation is not available yet, but it is possible for the Flexible Learning Centre to do this. The Flexible Learning Centre is located at the Mawson Lake campus of the UniSA. Lecturers do have the possibility to make several discussion boards and name every discussion board differently. So one discussion board can be named 'Background information', one discussion board can be named 'Lesson 1', etc. The lecturers have the possibility to give the students a 'read only' or 'write' permission. The lecturers can also make the several discussion boards active or non-active. This way the students cannot submit questions to the wrong lessons.

c) ***It is advised that all students and the lecturer receive an e-mail when something has been submitted on the discussion board.***

Because some students prefer to have an e-mail immediately when something is submitted, and other students would like to get it at the end of the day, they should get the opportunity to choose for themselves. At this moment students can choose if they want to get an e-mail immediately or not. It is advised that students also have the opportunity to choose if they want to get an e-mail immediately or at the end of the day. This e-mail would say: 'There are five new messages on the discussion board about 'this' and 'this' topic.' This possibility is not available right now, but it can be. This has to be spoken through with Flexible Learning Connection. They can change things in the courses' website.

2.2.2 Notice board in an e-learning environment

Results evaluation phase and the phase towards recommendations of the RMME course

The RMME and OTE course made use of a notice board. The notice board was not up-to-date. The students found the notice board very helpful. They can have a quick look on the notice board if there are updates and/or reminders. It reminds them of what is coming. This will stimulate them.

Recommendations for the RMME course

a) It is advised to keep the notice board up-to-date.

To make sure the notice board is used effectively, it is advised that the lecturer submit information at least once a week. The information put on the notice board can be reminders about assignments, new things that are submitted on the website, changes on the website, etc. It becomes then a weekly routine to look at the notice board. This way the lecturer will not forget to submit important information, and the students will not forget to look at the notice board.

b) It is advised that, when something new is submitted on the notice board, the students receive an email.

This means that the students look at the notice board on time. This is possible if the lecturer makes out of a notice board a discussion board. He has to take the same steps as creating a discussion board; he only names it then 'notice board'.

c) It is advised to submit the newest information on top of the notice board.

This way the students do not have to scroll down to read the new information. This will save time and is more motivating.

2.2.3 Online practice exercises

Results evaluation phase and the phase towards recommendations

The RMME and OTE course did not make use of online practice exercises. The lecturers and the students preferred online practice exercises in an e-learning environment.

Recommendation

a) It is advised to make use of online practice exercises

Tactics for developing online practice exercises

The University of South Australia (UniSA) has a link on their website to a UniSanet author help. This author help has been written to assist the lecturer with building the course website. It provides information on using the UniSanet authoring tools. The link to this site is:

<http://www.unisa.edu.au/unisanethelp/default.asp>

On this site information is provided on how to create online practice exercises. This can be found on the left-hand side of the site, under the button quizzes (this are online practice exercises). The link to this button is: <http://www.unisa.edu.au/unisanethelp/quiz/default.asp>

The lecturer can find instructional guides on how to create various practice exercises styles. The instructional guides are available in PDF format.

The following instructional guides can be found under this button:

- How to create an Enter Text UniSanet quiz
- How to create a Fill in the Blanks UniSanet quiz

- How to create a Match Label Items UniSAnet quiz
- How to create a Multiple Choice UniSAnet quiz
- How to create a Multiple Response UniSAnet quiz
- How to create an Order Text UniSAnet quiz
- How to create a True or False UniSAnet quiz

Once a quiz has been created the lecturer can add the quiz to his website. Under the button Quiz, there are two links about how to add a quiz and how to delete a quiz. These links contain an instruction how to do this.

Marking

It is advised to not mark the practice exercises. It is for the students' own learning, they can make use of the practice exercises if they want to, but it is not compulsory. Another reason for not marking the practice exercises is that it will cost the lecturer a lot of time.

Feedback

It is advised to give feedback on the incorrect answer: Why this answer is incorrect and what do the students have to read/look up to give the correct answer on the question. The UniSAnet author helps the lecturer how to submit feedback to the answers given.

2.2.4 Hyperlinks

Results evaluation phase and the phase towards recommendations

The lecturer and the students preferred the use of hyperlinks in an e-learning environment. With the use of hyperlinks it is easy to find information. The lecturer and the students mentioned that there should not be too many hyperlinks, because the usability of hyperlinks will drop, because the students get lost.

Recommendation

a) It is advised to make use of hyperlinks in an e-learning environment.

Principles of using hyperlinks

Hyperlinks should be clear and explicit, to make the students feel confident in the use of hyperlinks. To make this happen it is advised to keep the following principles in mind, when designing hyperlinks (Scratch media, 2005):

1. Text hyperlinks should be clearly distinguishable from normal text.
2. Hyperlink content should be as short as possible, yet long enough to identify either:
 - Where you will go
 - What you will get
 - What you want to happen
3. Hyperlinks with different targets should be clearly distinguishable.
4. Hyperlinks should give an indication of any unanticipated consequences, e.g.:
 - Links to files
 - Links that open or close windows

Other things a designer of hyperlinks should keep in mind are:

- Expressing size in hyperlinks. The user would like to know roughly how long the download of a file will take: will it be a few seconds, or minutes?
Example: *PDF (46.764 bytes)* (Scratch media, 2005):
- Users should not have the guess where the hyperlinks are, that's why a hyperlink should be coloured and/or underlined (Nielsen, 2004; Scratch media, 2005). The most readable

- way to render most text is black on a white background, and making [text hyperlinks blue \(#00f\)](#) works very well on white (Scratch media, 2005).
- Assuming the link text is coloured, it is not always a necessary to underline it (Nielsen, 2004).
 - There are two main cases in which one does not have to use underlines: navigation menus and other lists of links. This is true only when the page design clearly indicates the area's function. Users understand a left-hand navigation rail with a list of links on a coloured background, assuming it looks a lot like the navigation areas on most other sites.
 - Exception: underlining is essential if the link colours are red or green. This can cause problems for users with colour-blindness.
 - Exception: underlined links are important for low-vision users' accessibility.
 - Do not underline any text that is not a link, even if the hyperlinks are not underlined. This is confusing for the users (Nielsen, 2004).
 - Do not colour any text that is not a link (Nielsen, 2004).
 - Do not place links so close together that users with reduced motor skills will have difficulty selecting them. These guidelines are particularly important to ensure usability for older users (Nielsen, 2004).

2.2.5 Interactive animations and media

Results evaluation phase and the phase towards recommendations

The RMME and OTE course did not make use of interactive animations and media. The lecturer and the face-to-face and online students thought interactive animations could be useful.

Recommendation

- *It is advised to make use of interactive animations and media.*

For the lecturer of the RMME course it can be difficult to develop interactive animations by himself. There are different possibilities to develop the interactive animations:

Possibilities to develop interaction animations

- The lecturer can hire a company that develops the interactive animation for his course.
- The lecturer can hire the Flexible Learning Centre of UniSA to develop interactive animation for his course.
- The lecturer can ask an institute that learn students to develop interactive animation, if the development of animations for his course can be a project for the students
- The lecturer can learn to develop animations for his course. It will cost him time, but in the future he will benefit from it. SEEC does not have to hire a company for instance.
 - There is an online course available about developing interactive animations. This can be found on the following website:
<http://hotwired.lycos.com/webmonkey/multimedia/animation/tutorials/tutorial1.html>.
 - This is an animation tutorial, which consists of 7 lessons. The tutorial covers the following:
 1. Lesson 1: Tutorial Overview and Intro to Web Animation
 2. Lesson 2: GIF89
 3. Lesson 3: DHTML
 4. Lesson 4: Flash
 5. Lesson 5: Animation Approaches — Design
 6. Lesson 6: Animation Approaches — Sound

7. Lesson 7: Animation Approaches — Styles and Integration

- Additional reading

- Hamlin, J.S. (1999). *Effective web animation: advanced techniques for the web*. Massachusetts: Addison Wesley Longman.
(This book is available in the UniSA library)

This book brings one up-to-date with the tools and methods for creating animations that will not block bandwidth space or take forever to download. This book provides an overview of computer animation techniques and information on producing complex, efficient, animation using tools such as GIF, JavaScript, and Macromedia Flash.

Programs to use for developing interaction animations

There are different techniques that can be used to develop animations. One can make use of JavaScript rollovers, animated GIF, dynamic HTML, Macromedia Flash and Macromedia shockwave. The compatibility and performance of the underlying PC is an issue which of the techniques one should use.

GIF

The Animated GIF format can be used for simple animation effects, such as corporate logo's and tag line animations. The Animated GIF format requires no additional software to run. On the other side, GIF format files are raster-based and do not scale well (Williamson, 2000).

Table 1

Advantages and disadvantages of GIF animation (Hamlin, 1999)

<i>Advantages</i>	<i>Disadvantages</i>
Standard file format	Not object-oriented
Ease of creation	No sound
Large number of inexpensive tools available	No to little interactivity
Ease of implementation	Limit of 256 colours per frame
No server configurations needed	Animation is easy to steal.
Portions of animation can be transparent	
Highly compressible	
Many examples on the Web to learn from	
Easily viewed frame by frame in many GIF animation editors	

Flash

Flash can be used for more complexity and where interactivity is a requirement. The benefits of Flash increase as the complexity and size of the animation increases. So, flash becomes the animation tool for more complex requirements. Flash is now installed on almost 90 percent of PC's worldwide (Williamson, 2000).

Table 2

Advantages and disadvantages of JavaScript animation (Hamlin, 1999)

<i>Advantages</i>	<i>Disadvantages</i>
Interactivity	Easy to steal
Object-oriented	Support only by latest browsers

	(Netscape3 and later, Internet Explorer 4 and later)
Works with JPEG, GIF, and PNG	Currently only a few tools
Easy to implement	
No server configurations	
Transparency with GIF and PNG	
Variable image quality	

JavaScript

JavaScript is a scripting language and not an animation technology per se. It can be used to implement animation effects, such as interactivity and randomness. A good example of the use of JavaScript, are JavaScript rollovers. The user rolls the mouse over the screen and the images move into view. JavaScript can be used with GIF animations or with static JPEG or PNG images (Hamlin, 1999; Williamson, 2000).

Table 3

Advantages and disadvantages of Macromedia Flash animation (Hamlin, 1999)

<i>Advantages</i>	<i>Disadvantages</i>
Interactivity	Limited interactivity
Object-oriented	Limited scriptability
Works with JPEG, GIF and PNG	Plug-in required
Streaming	Separate utility exposes Flash files to the possibility of theft
Some protection from theft	
Java alternative for plug-in	
Vector-based compression	
Inexpensive	
No programming required	
Ability to script functionality with JavaScript	

2.2.6 Simulations: Role-play & Case-study

Results evaluation phase and the phase towards recommendations

The RMME and OTE course did not make use of role-play and case study. The lecturer and the students preferred simulations, especially role-play and case studies.

One student mentioned that a subject of a role-play in the RMME course could be that the students have to interview each other. In RMME you have to deal with interviewing people, so the role-play could be a good point to practice this.

Recommendation

a) It is advised to make use of simulations, especially role-play and case studies.

Guidelines for using role-play

Role-play will be effective if one runs it in the following way:

Creating the role play

1. The lecturer should familiarize himself with the role-play ahead of time. Underline important information that the role players should emphasize (Reilly, 1999-2005). Brainstorm about several issues to do with the students. Choose one which would make an

effective role play. Then choose six to eight roles for students to act out. These roles should be of people who will have different interests in the result of the discussion (McVittie, 2005).

2. Give the role players their parts to read. Each role should be described clearly and in a few words. The students should be able to read over the character descriptions in a few minutes (Reilly, 1999-2005; McVittie, 2005).

Preparing the students for role

3. There are two ways for preparing the students (McVittie, 2005):
 - One way is to give the students a week to prepare themselves for the role. This can be very effective, especially if the lecturer motivates and inspires the class. It can be a pleasant surprise, usually, to see the amount of preparation some of the students do for their roles.
 - Another way is to give the selected students five minutes before the performance, to read over their roles, and discuss their roles with the other members of the role play.
4. Regardless of which way the lecturer prepares his students for their roles, the lecturer should pick who will perform which role. There are two reasons for this (McVittie, 2005):
 - One reason is that the lecturer can have pedagogical reasons for choosing certain students.
 - The other reason is that the lecturer will have many different role plays throughout the term. The lecturer wants to balance the groups who act so that every student has a chance to act. The first role play will involve one or two of the more extroverted students, so that the more shy students will see how easy role plays are before they are forced to act.

The action

5. Just before the role play begins, the lecturer will introduce the role play. The lecturer will explain in the first role play students engage in what role playing is about. This will be less important as the students become familiar with how role plays work (McVittie, 2005).
6. The lecturer will make the problem explicit to your class. Whatever the line of action is, the actors must make a decision about an issue. The issue will be one where the right choice is not clear cut. In other words, your students should be facing a dilemma (McVittie, 2005).
7. The lecturer can set a time limit for the action. If the lecturer is going to set a time limit, he will notify his students of the time limit in advance, and he will also remind them at the point where they must stop action and make their decision (McVittie, 2005).
8. The lecturer takes each role player aside and (Reilly, 1999-2005):
 - Emphasizes the importance of playing the role realistically, and not being overly agreeable or overly stubborn.
 - Asks them to talk to the other role player(s) to get their stories straight.
 - Encourages them to show real emotion and to respond naturally to the good and bad things the mediators do.
 - Emphasizes the importance of their feedback to the mediators at the end of the role-play, and that their feedback is specific about what and when things were said.
9. The lecturer gives the observers instructions (Reilly, 1999-2005):
 - Take good notes about things that go well and things that go poorly.
 - Be specific about when in the process things happened and what exactly was said.
 - Ask them not to interrupt the role-play, but instead wait until the end to give their feedback.
10. During the role-play (Reilly, 1999-2005):

- Correct role players if they are not playing the roles appropriately. Note if they are:
 - jumping in and out of character;
 - playing to the audience;
 - trying to constantly “outsmart” the mediators; or
 - being too agreeable or too kind to the mediators.
- Help role players keep their stories straight. Make a note of new facts they make up in private sessions and be sure they share these facts with the other party.

Case-study

It is advised to keep the following principles in mind, when designing a case study (Herreid, 1997; Herreid, 1998; Driscoll & Carliner, 2005): A good case

- has a specific time frame. A good case is short. It is easier to hold the students’ attention for brief moments than long ones. Case studies must be long enough to introduce the facts of the case but not so long as to bore the reader or to make the analysis boring. If one must introduce complexity, do it in stages. First, give some data and then a series of questions and perhaps a decision point before more information is introduced (Herreid, 1997).
- specifies a sequence of events. A good case study tells a story. A good case study focuses on an interest-arousing issue.
- contains a plot structure – an issue (what should be/have been done?). It must have an interesting plot that relates to the experiences of the adult learners.
- is relevant to the reader. Case studies should be chosen that involve situations that the students know or are likely to face. This improves the empathy factor and makes the case study really something worth studying.
- must have pedagogic utility. What functions will the case serve? What does it do for the course and the student? What is the point of the story in the education of the student and is there a better way to do it? When using the case study, it should be made incredibly explicit to the students what is expected from them; what they need to look for, or what they need to discuss afterwards.
- has generality. The lecturer should know what he/she wants to accomplish in the case study: what facts, principles, view points the students should cover.

The lecturer can make a case study him/herself, use a case study of a colleague, or search on the Internet for case studies. When a lecturer types in ‘case study’ in search engine Google, he/she will get many hits. For example:

<http://ublib.buffalo.edu/libraries/projects/cases/case.html>.

This is a website from the University of Buffalo. Here one can find case studies from for example the NASA, technology reviews and other scientific case studies. Also hyperlinks to other sites with case studies on it are offered.

According to Palloff & Pratt (2005), the lecturer can also encourage students to bring case studies from their own work or life situations into the (online) classroom. Students receive input from their group-members on potential solutions.

2.2.7 Recorded lectures

Results evaluation phase and the phase towards recommendations of the RMME course

The course did not make use of recorded lectures. The lecturer and the students preferred recorded lectures in an e-learning environment.

Results evaluation phase and the formative evaluation of the OTE course

The course did not make use of recorded lectures. The lecturer and the students preferred recorded lectures in an e-learning environment. The lecturer preferred recorded lectures that are embedded in a PowerPoint slide.

Recommendation (for both courses)

a) It is advised to make use of recorded lectures in an e-learning environment.

Guidelines for recorded lectures

- For each lecture to be recorded (Virtual university, 2005):
 - Prepare a detailed script
 - Prepare slides
 - Prepare graphics (figure, tables, etc., to be provided electronically)
 - Define animations for video insertions where appropriate
- Select the technical recourses that will be used during the lecture (beamer, PowerPoint presentation, whiteboard, computer/laptop) (University of Amsterdam, 2005).
- Restrict the number of sheets up to absolutely necessary minimum for the support and for understand the explanation (University of Amsterdam, 2005).
- Structuring of the content in order to facilitate treating video recordings (University of Amsterdam, 2005):
 - Structure the content in logical components that include an explanation of, for instance a term.
 - Give a clear introduction and conclusion or summary.
 - In case of a continuation college: give a short overview or summary of the previous college to make connection to the new college.
- Presentation during the lecture (University of Amsterdam, 2005):
 - Speak loud and clear', not to fast, however on a natural manner.
 - In case of using a beamer: point on the sheet and not on the screen. This is clearer on the video and gives a quieter picture and overview.
 - Check if the sheet is sharp on the display device.
 - Restrict walking to a minimum. This to avoid that the lecturer runs out of the range of the camera.
 - Avoid the use of two sheets at the same moment; it creates obscurity and is difficult to synchronize with the video in the template.
- The total recorded time of each lecturer should not be too long, around 1 hour (Virtual University, 2005).
- Wherever possible, theory should be explained with the help of examples taken from everyday live (Virtual University, 2005). This fits with the characteristics of adult learners.
- The lecturer is responsible for reviewing the recorded lecture immediately after the recording session to identify any mistake either in content or in delivery and take necessary steps to remove the mistake in the next recording session (Virtual University, 2005).

Recorded lecture with the use of audio

There are different possibilities available to add recorded audio with a lecture:

- Directly into PowerPoint
- Separate WAV files
- Streaming files

- Combined audio and video
- MP3 files
 - Audio files
- Adding multi-media content

Below, in table 4, the differences between these possibilities will be described (Kasser, 2005):

Table 4
Possibilities of recorded lectures with audio

Possibilities	Differences
PowerPoint	<ul style="list-style-type: none"> - No additional software required - Produces very large files - Sound cannot be edited
WAV files	<ul style="list-style-type: none"> - Needs recording software - Inexpensive Shareware - Can readily be embedded into PowerPoint - With 3 clicks - 5 second minimal time limitation
Streaming files	<ul style="list-style-type: none"> - Needs a server - Tends to be real-time - Many producers - Real Media http://www.real.com - Windows streaming files
MP3 files	<ul style="list-style-type: none"> - Records audio as WAV file(s) - Converts to MP3 - Free Lame software from GoldWave site - Relatively low bandwidth - Voice quality, not CD - Reasonable file sizes - If one file, requires speaking prompts

If the lecturer does not know how to record audio, he/she can contact Joseph Kasser. He is experienced with recording audio and also works at the unit SEEC.

Use of recorded lectures

- The lecturer can submit on his website a whole recorded lecture of about 1 hour.
- The lecturer can submit in the PowerPoint slides of his website, a part of the recorded lecture. These parts explain important information, which is hard to understand for the students without the explanation.
- The lecturer can submit on his website a recorded lecture of 1 hour in two pieces. After the first half our, there are some question for the students to answer. This way, students can see if they have understood the lecture and can otherwise go back and listen again.
- Download time of a recorded lecture.

When the lessons make use of recorded lectures (video and/or audio), the download time of the different lessons will increase. For some students with a dial-up connection it will be hard to download these recorded lectures. To make sure all the students can make use of the recorded lectures, it is advised that the lecturer gives the students the opportunity to receive the recorded lessons on a CD. This possibility can be announced at the beginning

of the course. This possibility can be added to the e-mail about how to log-in and were the students can get help if they cannot log-in.

2.2.8 Live virtual classroom

Results evaluation phase and the phase towards recommendations

The RMME and OTE course did not make use of a live virtual classroom. The lecturer and the online students preferred the use of a live virtual classroom, because it improved the e-learning environment. The lecturer mentioned it will be useful to make use of a live virtual classroom two times in the course, especially for the online students. It will be too time-consuming and expensive to use it much more.

Recommendation

a) It is advised to make use of a live virtual classroom.

Tactics for using live virtual classroom

Tactics for the live virtual classroom can be divided into two groups: communication-based tactics and collaborative-based tactics. In the following section these two tactics will be explained (Driscoll & Carliner, 2005):

Communication-based strategies

Communication-based tactics are good for making learners aware of facts, concepts, principles, and processes.

Lectures

The goal of this is to deliver information to the students, just like in a face-to-face classroom session.

News magazine

The goals of news magazines are to deliver information and, if needed, to motivate the audience to seek additional information by going to a website. One of the advantages of using the news magazine format in the virtual classroom is the ability to interact with the audience via live questions and answer and to poll the audience for instant feedback.

Talk show

The goal of this is to make a subject-matter expert accessible to students and to communicate information. In the live virtual classroom, the students can send in questions in advance or interact with the guest by asking real-time questions. This format requires planning for the lecturer and the guest. Successful communication requires sharing the interview questions in advance. It is helpful if the guest supports slides or graphics to his or her responses.

Expert panel

The goal of this tactic is to bring a group of people together to provide a perspective. This can be difficult to do, because the lecturer has less control. Strong facilitation skills are needed to summarize the panel's comments and to manage and direct students' questions to the right panel member.

Collaboration-based strategies

Collaborative learning is defined as a style of teaching and learning where students work in teams toward a common goal. The following strategies rely on some form of collaborative

learning or group work. These strategies have consequences in the traditional physical classroom and in most cases the live virtual classroom only changes the medium.

Case study

There are several ways to organize a case study. The easiest way to do this is to provide a short text-based case study as part of the live virtual classroom session. If the case study is more complex and the student has to review number, tables etc, it is advised to send the students these items in advance. Focus the live virtual class time on discussions and case work.

Action learning

In action learning, the students bring a real problem forward that must be solved by the group. Action learning via the live virtual classroom allows learner from different background to come together easily.

Modelling and Role Play

Modelling and role-play-based lesson should be done with small groups, allowing for frequent and active participation, practice and coaching. A live virtual classroom role play differs from a traditional role play in that the live physical aspects such as personal space and overall body language are not visible (most live virtual classrooms are optimized for close-up shots of the learners' face) and the observers are virtual.

Guidelines for designing for the live virtual classroom

When designing a live virtual classroom, there are some guidelines to keep in mind.

According to Driscoll & Carliner (2005) that are the following:

- Use a script, like the sample shown in table 5, to plan the program. The script will help determine what graphics are needed, provide a sense of program flow, and provide a rough estimate of timing.
- Keep the program short. There is no exact length of how long or short a live virtual classroom program should be. This depends on the topic, the audience, their level of technical skill, and how much content the lecturer must teach.
- Consider class size.
- Determine how familiar your learners are with the live virtual classroom. The first lesson should allow time to provide an orientation. It is advised that the lecturer introduce the features such as polling, whiteboards, application sharing, assessments, hand raising, feedback, and yes/no responses slowly.
- Becoming a skilled presenter takes time.
- Take time to check in with the audience. Use live virtual classroom tools such as pacing meters, hand-raising, and yes-no buttons to get feedback.
- Start and finish on time. Strive for the discipline needed to start and finish the program on time. This means having the lecturer and program arrive ten to fifteen minutes in advance and someone dedicated to act as time-keeper. It is easy to fall behind unless the script has markers to help the lecturer know how they are doing relative to the absolute time.
- Rehearse the program. Even when the content is familiar to the lecturer, running a rehearsal is important. Without a rehearsal, the lecturer can be surprised by the complexity of the interface and all the places on the screen that need to be monitored. It is also important to make notes during the rehearsal as to where the lecturer will stop and ask for feedback.

- Draft questions for the live virtual classroom. It comes as a surprise to many instructors to find that questions that work well in the traditional classroom such as ‘How many of you completed the pre-work?’ and ‘Are there additional topics you hoped I would cover?’ do not work in live virtual classrooms. Questions need to be carefully translated into questions that indicate how the lecturer want the students to respond, for example, ‘Please press yes if you completed the pre-work,’ and ‘Please use the questions dialog box to send me the additional topics you would like to discuss.’

Table 5
Sample Live Virtual Classroom Script

Elapsed time	Time remaining	Event	Audio	Visual	Comments
5 min. prior to start	60 min.	Program opening	Music	Title graphics and call in numbers for - conference call tel. number - help desk tel. number	Make sure the LVC is ready and running 5 minutes before official start time
3 min.	57 min.	Introduction	Host introduces Senior VP of Branch Bank Retail Sales	Photos of host and VP with captions	This program may be delivered three times. The third time the Junior VP will deliver the presentation. Create an alternative slide for this segment.
.

2.2.9 PowerPoint slides with pictures, graphics and diagrams

Results evaluation phase and the phase towards recommendations of the RMME course

More pictures, graphics and diagrams would help students understand the content better. This way the lessons would fit better with several learning styles. The students and the lecturer said it was important to have more pictures, graphics and diagrams.

Recommendation for the RMME course

a) It is advised to make use of PowerPoint slides with pictures, graphics and diagrams.

Using visuals has several learning benefits (Driscoll & Carliner, 2005):

- Visuals best communicate inherently visual content, such as a product, a process, and the comparison of results.
- Visuals communicate some ideas more efficiently than text.
- Learners remember visuals, especially images they interact with frequently.
- Visuals appeal to the affective domain by gaining and holding attention and by building trust.
- Visuals accommodate learners with a need for visual content.

Guidelines for using visuals

Some guidelines for using visuals according to Driscoll & Carliner (2005) are:

1. Pay attention to aesthetics

Visuals should be simple and contain only necessary elements. There should be a balance in the visual. That is, the different parts of the visual do not compete for the learners’ attention.

If the visual is showing a procedure or an organization chart, it is advised to reveal the procedure or the organization one part at a time. This is called a build sequence. When students have finished reading, the next part appears on the screen. It is best to let the students press Enter before the next part appears on the screen. This way, every student can read in his own pace. In a PowerPoint presentation, avoid annoying effects; items should just appear on the screen.

2. Balance visual appeal with usability

There should be a balance between form and function; students should easily find information of interest and move in this information.

3. Make visuals comprehensible

This can be done by removing irrelevant details from images. This can be done by cropping out irrelevant details in a photo retouching software programme (like PhotoShop and Microsoft Photo Editor).

Also labelling visuals properly will make visuals comprehensible. Well-placed words help learners properly interpret visuals. For example labelling axes, providing a legend, labelling key parts so students can associate names with different parts of a product or process.

4. Avoid using visuals solely for adornment

If visuals have no educational value they can only distract the students from learning. One thing to keep in mind is that graphic files have much more data to transmit and, as a result, can load more slowly, especially on dial-up connections. So there must be a balance in the need for graphics with the use of a dial-up connection to the Internet. To avoid loading times, graphic files should be kept as small as possible. This can be done by limiting the amount of detail in graphics, and by using the JPEG format for photographs in stead of GIF, or other formats.

The advantages of GIF files are (Lynch & Horton, 2002):

- It is the most widely supported graphics format on the Web.
- GIFs of diagrams look better than JPEGs.
- GIF supports transparency and interlacing (Hamlin, 1999).

The advantages of JPEG images are (Lynch & Horton, 2002):

- Huge compression ratios mean faster download speed (the size of JPEG files is smaller than photographs stored in other formats).
- JPEG produces excellent results for most photographs and complex images.
- JPEG supports full colour images.

For more information on visuals, see chapter 13 in Driscoll, M. & Carliner, S. (2005). *Advanced web-based training strategies. Unlocking instructionally sound online learning.* Pfeiffer: San Francisco.

2.2.10 Classroom Discussions

Results evaluation phase and the phase towards recommendations

The students preferred the use of classroom discussion. The students and the lecturer found classroom discussion very important, so they can hear somebody else's opinions.

Recommendation

a) It is advised to make use of classroom discussions.

Types of class discussion

Dempster and Raff (1992) mention that there are two basic types of class discussions: open ended and problem solving.

Open ended discussions:

In open ended discussions the topics are usually general in nature, even though they may be controversial. They should provide possibilities for discussion where any numbers of possible outcomes are acceptable. The topics can be varied on current events and interests of the students. There is no need to draw a conclusion at the end of these discussions, because they are open ended (Dempster & Raff, 1992).

Problem solving discussions:

Problem solving discussion can be used in a variety of situation, but must have an outcome which should be understood and accepted by all members of the group. When problem solving discussions turn up with answers/solutions, these solutions should be realistic (Dempster & Raff, 1992).

Tactics for using classroom discussion

When having a classroom discussion, the following tactics make a classroom discussion effective:

1. Set clear expectations for student participation in discussion sessions.

The lecturer lets the students know, on the first day of class, if a portion of their final grade for the course will be based on how effectively they participate in class discussion sessions. The lecturer can specify a class rule like “The students are not allowed to say ‘I do not know’ in this class when asked a question.” The students are not required to *know*, but they are expected to *think*. So if the lecturer asks a question and the student does not know the answer, he/she is responsible to think of an answer, to guess, to speculate, to wonder aloud (Barton et al., 2005).

2. Break the ice with informal talk outside of class.

Informal "small talk" may help break the ice before a discussion, and a relaxed and comfortable student will regularly tend to add her or his opinions to the conversation (Barton et al., 2005).

3. Control and use classroom space strategically.

Krahnke (English Department, Colorado State University, In Barton et al., 2005) and Dempster and Raff (1992) mention it is important that the students put their desks in a circle or horseshoe shape. This prevents them from hiding in corners or behind other students' bodies. The circle improves communication by allowing them to see each other's faces and hear each other's responses.

The circle or horseshoe shape also allows the teacher easier physical access to students than does the narrow passages of the row/column grid.

4. Participation.

According to Barton et al. (2005), the role of the lecturer is also to ensure that everyone is participating and ensuring that no-one dominates the discussion. Krahnke (English Department, Colorado State University, In Barton et al., 2005) suggests that establishing eye contact opens a communication channel. If the lecturer makes eye contact with the students in class, they are more likely to stay involved—and if they are not involved, he will know it immediately.

5. Avoid open questions; call on individual students.

Krahnke (English Department, Colorado State University, In Barton et al., 2005) suggests using direct questions to specific students and distributing turns around the room. This will increase the number of students who participate. If the lecturer consistently asks questions that are open to anyone in the class to answer, that will allow the hyper-verbal students to dominate and allows others to hide (Barton et al., 2005).

6. Ask good questions.

The kinds of questions that are asked can make all the difference between an effective and ineffective discussion. It is advised that the lecturer writes down a script of questions he wants to ask during a class discussion, being open, so there is the possibility to move away from the plan.

Barton et al. (2005) suggest to avoid some forms questions:

- The "Guess What I'm Thinking" Question - in which the teacher asks a question to which he or she already has a specific answer in mind. This makes "class discussion" into mind reading for students. Questions like "What *should* Mark have done to improve his focus?" asks the students to guess at the answer hiding in the lecturers head, whereas "What *could* Mark have done to improve his focus?" asks for their input.
- The Yes/No Question and the Leading Question - in which the teacher's question can be answered with a simple yes or no, which stops a discussion.
- The Information Retrieval Question - in which students are asked to simply look in the text at hand, find specific, concrete information, and bring it back to the teacher.

7. Concluding the discussion

The lecturer's role is to bring the discussion to a positive close. This can be done by summarising the discussion or clearly state the final agreed solution in a problem solving discussion (Barton et al., 2005).

2.2.11 Group-work

Results evaluation phase and the phase towards recommendations

Group-work was not working effective. The students found it difficult and the discussions did not contribute to their learning process. The students did prefer working with other students. The students and the lecturer found group-work very important.

Recommendations

a) It is advised that at the beginning of each course some time is spend on how to work effectively in groups.

The students should encourage and stimulate each other in the group to have meaningful discussion. The atmosphere should be one in which the students want to learn from each other and share experiences, not to keep everything for themselves. Students should be made aware of the fact they are expected to have a pro-active attitude and contact each other to discuss topics. They should not wait until the lecturer tells them.

Group-work can be a key factor in making distance courses as good as or better than face-to-face courses (Hiltz & Wellman, 1997, In Turoff, Discenza & Howard, 2004).

Benefits group-work

Turoff et al. (2005) name several benefits of group-work:

- Due to social pressures, students tend to be more concerned with how other students view their work quality than how the lecturer views it. They are significantly more motivated to participate in a meaningful way when their fellow students can view their contributions.
- When equality of communications is encouraged, students cannot get away with being passive or lazy. The transcript or electronic recording of the discussions on the discussion board shows who is and who is not participating. It is visible to both the lecturer and other students that someone is being lazy.
- It becomes more noticeable what the outstanding students learn.
- The performance of students at the lower end of the distribution is improved. The communication systems permit them to catch up, because they are able to obtain a better understanding of the material with which they are most uncomfortable or have the least background knowledge.

The lecturer can use the document made by the Learning Connection of the University of South Australia about group-work:

<http://www.unisanet.unisa.edu.au/learn/learningconnection/?PATH=/Resources/workshop%20Dteams/Working+in+teams/&default=Welcome.htm>

b) It is advised to submit a document in the e-learning environment of how to work effectively in groups.

Every student should have access to this document. To make sure every student reads this, the lecturer can say in the meetings and write on the website in the schedule ‘To improve your grade – download these papers and read them.’ This gives the students a reason to read the documents. The hyperlinks below provide a good guidance for working in groups. The first is made by the Learning Connection of the University of South Australia:

<http://www.unisanet.unisa.edu.au/learn/learningconnection/?PATH=/Resources/workshop%20Dteams/Working+in+teams/&default=Welcome.htm>

A second hyperlink leads to a document also used by Joseph Kasser, a lecturer of unit SEEC, in his distance courses:

<http://web.cba.neu.edu/~ewertheim/teams/ovrvw2.htm#effect>

The lecturer can choose which hyperlink he wants to submit in his course.

c) It is advised that the lecturer stimulates group-work, by showing interest in how the group-work is progressing.

In the meetings the lecturer can walk to each group and ask how the group-work is going, if there are any problems. When working on the tutorials and for the online students, the lecturer can call different members of the groups and ask them how the group-work is going. By calling different members in a group, and not always the same person, the lecturer gets a good idea how the group-work is really going.

d) It is advised that halfway through working in groups in the course, the students fill in a questionnaire about collaboration.

The questionnaire is provided below in table 5. When using this questionnaire, students have to think about how the group-work is going and what their own role is in the process. When necessary they can change things for the rest of the course to make the group-work, go better. The lecturer can stimulate the students to reflect on the group-work, by making it clear to them at the beginning of the course that they can improve their grade by participating active in group-work and when they fill in the collaboration questionnaire. When they submit a filled in questionnaire in which it is clear that they have really done their best to reflect on how the group-work is going, this will be 2% of their grade. By giving the students a grade for filling

in the collaboration questionnaire, they are more willing and motivated to do it. It is recommended that the collaboration questionnaire will not be marked, but that it is compulsory. The Collaboration questionnaire should be printed on one A4, with a front and a backside.

The inclusion of reflection on the application of the collaborative group-work in a (online) class can help to develop skills students need to lead or function in a virtual team in the work environment (Palloff & Pratt, 2005). Reflection can promote the further development of one's skills or individuality. Mathews and Sayers (1997, In Vos & Vlas, 2000) say: "If you always do what you have always done, you will always get what you always got". Without reflection, without looking back at your own actions (experiences, activities), ideas (knowledge, insights) or attitude (emotions, feelings), no-one gets easy sight at and insight in his own possibilities, and without that no-one can develop his/her competences further, in the sense of: completing, improving, replacing, fitting or combining with other operations, ideas and attitudes (Vos & Vlas, 2000).

Reflection topics

Topics to reflect on, mentioned by Reed and Koliba (1995), can be:

- **Establish goals:** When starting to work in groups, first some basic rules and goals have to be established like the teams' vision or strategy, how work will be divided, who the team leader is and how group members are going to communicate.
- **Create a safe space:** The key to open and honest reflection is an environment in which participants feel safe and comfortable. In order for group members to express their thoughts and opinions they must feel that they can do so without fear of attack or criticism (Palloff & Pratt, 2005). Participants who feel safe are more likely to make honest and genuine contributions and to feel solidarity and respect towards other group members.
- **Manage disagreements:** It has been said that "whatever resists will persist." Each group member should look at recognizing tension building in the group, and respond to it immediately. Among the most useful strategies is to repeat the ground rules established by the group (Palloff & Pratt, 2005), including a reminder that criticism should relate to ideas not to people. It is important that negative behaviour is handled immediately so that participants do not get the impression that the negative behaviour is ignored and therefore tolerated.
- **Promote equality:** Equality of participants should be communicated and modelled by all participants. It should not be permitted that group members are arguing up against any group member(s), and should not take sides in any developing debate. Such situations can be counteracted by recognizing all members, and encouraging their participation equally (Palloff & Pratt, 2005).
- **Be mindful of power, and who has it:** All groups have opinion leaders or people who most others look up to. Often, these opinion leaders will set the tone for a discussion, thereby limiting active involvement of the more reserved members. Therefore it is important that other opinions are heard too.

Other topics one can reflect on, mentioned by Palloff and Pratt (2005) and Reed and Koliba (1995), are:

- knowledge of the group
- keeping the group on track
- avoiding/ not avoiding topics
- dealing with disagreements
- encouraging challenging issues

Collaboration questionnaire

Students can use the questionnaire in which the previous literature is combined (table 6). This questionnaire is based on the Collaboration Questionnaire on Assessment provided by Palloff and Pratt (2005, p. 52):

Table 6

Collaboration questionnaire

<i>Collaborative factors</i>	<i>Strongly agree</i>	<i>Somewhat agree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat disagree</i>	<i>Strongly disagree</i>
We established common goals.					
We communicated well as a team.					
We dealt well with disagreements in the group.					
Group discussions were contributing to my learning.					
We chose a leader without difficulty.					
Everyone contributed equally to the final product.					
We had adequate time and resources to complete our task.					
I was satisfied with the way we worked together.					
I was satisfied with the final outcome.					
I feel that I learned from the group-work activities.					
Please add some comments on why you think some collaborative factors went well:					
Please add some comments on why you think some collaborative factors didn't went well:					
Please add some comments on how you think you can improve the group-work:					
Please add here any other comments about the course:					

2.3 Recommendation with respect to feedback

This section will discuss recommendations about improving feedback for the RMME course.

Results evaluation phase and the phase towards recommendations of the RMME course

Feedback on assignments was not always timely. The students did not get any marks back yet, so they did not know how far learning had progressed. Students did not always receive personalized feedback from the lecturer. The overall course did not contribute to the online students' knowledge and/or basic skill base. The students and the lecturer found feedback in the right way and at the right time really important.

Recommendations for the RMME course

a) It is advised to answer e-mails or phone calls within 3 business days.

This way the lecturer has enough time to think about the question. The lecturer can also be very busy when he gets the e-mail or phone call, but it should be possible to answer them within 3 days. For students 3 business days is not too long. If it takes more than 3 days, students can get de-motivated and not want to finish the assignment on time.

b) It is advised to mark assignments within 3 weeks.

Lecturers can be very busy with other things, but they made the schedule of the course, so they know when students deliver something that has to be marked. Marking can take a lot of time, but 3 weeks should be enough. For students it is important they get a mark back on their work, as soon as possible. Otherwise the effect of the feedback is gone (Desimone, Werner & Harris, 2002). Students need to know how they did it. This keeps them motivated (Desimone et al, 2002). If they do not get a mark back, or only after 2 months, then students do not know what they have submitted and it is not really relevant for them anymore.

c) It is advised that the feedback is constructive.

Feedback should not only be negative, students need to know what can be improved. Here, it is also important that they need to know how it can be improved. Students also need to know what they did well and why it is good (Palloff & Pratt, 2005). So, the feedback needs to be informational (Desimone et al., 2002). According to Van Dellen (2001, In Kessels & Poell, 2001), good feedback promotes effective learning.

d) It is advised that every student receives personalized feedback on their assignments.

This is important, so students know where they are in their learning process. When they only get general feedback, they cannot do that.

e) It is advised that general feedback is submitted on the discussion board.

This way all students can read it. This is important, because if general feedback is told in class, then the online students and the students who could not attend the meeting did not hear it. When students start working in the next assignment they can read the general feedback again and keep that in mind while they are working on the assignment.

2.4 Recommendation with respect to assignments

This section will discuss recommendations about improving the assignments for the RMME and OTE course.

Results evaluation phase and the phase towards recommendations

It is not clear for the online students what was expected from the assignments. The students and the lecturer found it important that assignments are clear and explicit.

Recommendations

a) It is advised that the written material is more explicit as to what steps need to be taken to complete the assignments.

This way the online students know better what steps they need to complete to finish the assignment. Palloff and Pratt (2005) suggest that when a lecturer submits the question ‘Is everyone clear about the assignment task?’ on the discussion board, this will free the students up to ask questions that they might otherwise be embarrassed to ask. In this way bad assignments submitted by students can be prevented.

b) It is advised that the lecturer submits extra information concerning the assignments on the discussion board.

This recommendation is especially important when in the face-to-face classroom sessions there have been several questions about the assignment, or when he receives e-mails or phone calls with the same questions in it. If the lecturer submits this information on the discussion board it can be accessed by all students and especially for the online students this is useful.

2.5 General recommendations

In this section some general recommendations are discussed, that are usable in both the RMME and OTE course, but usable in other courses as well.

A. Course explanation

Results evaluation phase and the phase towards recommendations

It was not clear for the students what they should expect of the course, before the course started.

Recommendation

a) It is advised to submit more detailed course information on the universities website.

Students have a look at the universities website to find out more about the course. This information helps them make a decision of what wish to enrol. Especially for elective courses this is important. But for compulsory courses it is also important that students know what to expect. This way, students can make a better decision.

Information on the universities website should contain:

- Aims and objectives of the course;
- List of lessons and the topics that are going to be discussed in those lessons;
- How many face-to-face meetings there are;
- How many assignments there are in this course;
- A short description of the assignments; and
- The amount of group-work and individual work.

B. Course website (e-learning environment)

Results evaluation phase and the phase towards recommendations

The buttons of the website for each course were not in the same order. The course outlines did not use the same format and this can be confusing for the students. The students and the lecturer thought it was important that every course puts the buttons in the same order and that every course uses the same format.

Recommendation

- a) *It is advised to put the buttons in the same order.*
- b) *It is advised to use the same format for the course outline.*

Buttons

In table 7, the order for the buttons is provided. This order can be used by all the courses within SEEC.

Table 7
Order of the buttons

RMME	OTE
Sitemap	Site map
Notice board *1	Notice board *1
Welcome	Welcome
Preparing for online learning - Website information - Getting help	Preparing for online learning - Website information - Getting Help
Contacts - Staff contact - Student contact	Contact - Staff contact - Student contact
Course information - Course outline	Course information - Course outline
Assessment - Tutorial 1 - Tutorial 2 - Etc	Assessment - Tutorial 1 - Tutorial 2 - Etc
Lessons *2 - Lesson 1 - Lesson 2 - Etc.	Lessons *2 - Lesson 1 - Lesson 2 - Etc.
Additional resources - Additional text - Websites - Etc	Additional resources - Additional text - Websites - Etc
Discussion page	Discussion page
Future Directions & Summary	
Sample Proposals	
Help	Help

*1

It is advised that the notice board is the first thing that opens when the students visit the course website. This way the students see immediately if something new is submitted or changed on the website.

*2

Under the button lessons the students can find a table like followed:

#	Date (and place)	Theme	Readings	Lecture options
1	25-10-2005	Qualitative research	Chapter 1 Driscoll & Carliner Article:	PowerPoint slides Recorded lecture Practice exercises
.

It is advised to hyperlink the readings and lecture options, so it is easy to access for the students.

Course outline

It is advised to use the following contents for the course outline document of the different courses:

- [Welcome](#)
- [School contact details](#)
- [Course statement](#)
- [Learning objectives](#)
- [Unit value of course](#)
- [Graduate Qualities profile](#)
- [Text\(s\)](#)
- [Course home page](#)
- [Extra course information](#)
- [Other resources](#)
- [Assessment summary](#)
- [Assessment details](#)
- [Important information about all assessment](#)
- [Students with disabilities](#)
- [Submission and return of assignments](#)
- [Referencing](#)
- [Re-Submissions](#)
- [Extensions](#)
- [Return of Assignments](#)
- [Evaluation of the course](#)

C. Delivery environment

Results evaluation phase and the phase towards recommendations

The students and the OTE lecturer preferred a blended learning environment. The RMME lecturer did not prefer a blended learning environment; he preferred a synchronous face-to-face delivery environment. This is not possible, because there are also students who follow the course only online. Blended learning is than a good alternative.

Recommendation

- a) *It is advised to have more face-to-face meetings for the OTE course.*

Students can meet and interact with each other in face-to-face meetings. They think that is very important. Now the OTE course is offered as an online course, but students would like to have face-to-face meetings. The OTE lecturer offered a couple of workshops in his own time, this is really helping the students; they would like to have them even more.

D. Access e-learning environment

Results evaluation phase and the phase towards recommendations

Some students have problems with log-in. The students and the lecturer found it important that students know who they can contact if that happens.

Recommendation

- a) It is advised that the lecturer send all the students an e-mail at the beginning of the course to check if the students can log-in and if they have problems with this, who they can contact. Students should all respond to this e-mail.*

This way the lecturer knows if the students can log-in, and gives them help if they cannot do this. If students have problems with log-in during the course, they know who they can contact and do not have to spend a lot of time searching in the universities website for a contact person.

E. Delivery of learning material

Results evaluation phase and the phase towards recommendations

Lectures/resources get delivered a week before the lessons, that is too late. Because of their busy work schedule students are having difficulties to plan everything in. They can get behind because of this. The students and the lecturer thought it could be helpful for the students when material is delivered two lessons ahead.

Recommendation

- a) It is advised to deliver the learning material two lessons ahead.*

This way the students can schedule their studies better into their work schedule, but cannot work too far ahead.

3 Planning

In the previous chapter the conclusions of the different activities and the belonging recommendations for each course and some general recommendations were presented. This chapter will elaborate on the planning for the recommendations. A distinction is made between planning while the course is running (section 3.1), a short term planning (section 3.2) and finally, in section 3.3, a long term planning is presented.

3.2 Planning while the course is running

There are a lot of suggested recommendations that need to be taken care of while the course is running. These recommendations are scheduled in table 8.

Table 8
Recommendations scheduled in the course

<i>Recommendation</i>	<i>Explanation</i>	<i>Who is responsible?</i>
It is advised that the lecturer creates a place on the discussion board where students have to submit in short their personal background information.	Students need to submit their personal information at the beginning of the course, so they can use this information during the rest of the course	Students are responsible, but the lecturer should encourage students to do this and make it compulsory.
It is advised that the lecturer calls the online students at least one time during the course.	This has to be done during the course, so the lecturer should organize some time in his agenda to do this.	The lecturer.
It is advised that the lecturer uses the students' background information in the material, so that especially the online students can relate to it.	Once the students have submitted their personal background information, the lecturer can have a look at these and use them for examples, or explaining something.	The lecturer.
It is advised that the lecturer stimulates the students more to use the discussion board by: <ul style="list-style-type: none"> - Submitting general feedback on the discussion board. - Submitting relevant questions, asked by one student via for example e-mail or in the face-to-face meetings, on the discussion board. - When a student places a question on the discussion board, it is advised that the lecturer also gives the other 	This can only be done during the course, when students have submitted assignments, or have questions about the lessons/tutorials.	The lecturer.

<p>students opportunities to answer that question.</p> <ul style="list-style-type: none"> - It is advised that the lecturer respond after a couple of days (for example at the end of the week) to the answers given by the student. 		
It is advised to keep the notice board up-to-date	Every week some new information should be submitted.	The lecturer.
It is advised to make use of a live virtual classroom.	The live virtual classroom is held during the course. Once the students have enrolled they can start making arrangements for participating in the live virtual classroom. The lecturer should prepare the live virtual classroom.	The students have to make sure they are available at the suggested date and arrange the facilities for them to participate. The lecturer is responsible for coming with a date to hold the live virtual classroom at a proper time. He is also responsible for the way the live virtual classroom is going.
It is advised to make use of classroom discussions.	A discussion is held during the course, when a question was asked, or when students have a different opinion about a topic.	It is the lecturer's responsibility to ensure that no-one is dominating the discussion and that everyone is participating. He has to make sure the discussion comes to a positive end. It is the responsibility of the students to participate active in classroom discussions and to make sure that everyone can say what he wants to say.
It is advised that at the beginning of each course some time is spent on how to work effectively in groups.	This is scheduled in the first meeting. The lecturer has to prepare himself for this.	The lecturer.
It is advised that the lecturer stimulates group-work, by showing interest in how the group-work is progressing.	This is something the lecturer has to do when the students work on the tutorials, so this can only be done during the course.	The lecturer.
It is advised that halfway of working in groups in the course, the students fill in a	This is done during the course. Students cannot know how group-work is	The lecturer is responsible for making sure that the students know they have

questionnaire about collaboration.	going before the course.	to fill the questionnaire in. The students also need to know where they can find this questionnaire. The students are responsible for filling the questionnaire in as honest and serious as they can.
It is advised to answer e-mails or phone calls within 3 business days.	This is necessary when students send an e-mail or phone during the course.	The lecturer.
It is advised to mark assignments within 3 weeks.	This is during the course, because students make assignments during the course.	The lecturer. He has to create time in his agenda before the course starts, so he can be sure that he can mark the assignments within 3 weeks after they have been submitted.
It is advised that the feedback is constructive.	This can only be done during the course, when it is necessary to give feedback.	The lecturer is responsible for giving constructive feedback.
It is advised that every student receives personalized feedback on their assignments.	This should be done during the course, because students make assignments during the course.	The lecturer.
It is advised that general feedback is submitted on the discussion board.	This can only be done during the course, when it is necessary to give feedback.	The lecturer.
It is advised that the lecturer submits extra information concerning the assignments on the discussion board.	This can only be done during the course. The information concerning the assignments was put on the course website before the course started, so only extra information has to be added. For example when the same question is asked by the students, it is better to put the question and the answer on the discussion board.	The lecturer. He has to think if it is a relevant question for all students. Also when a question was asked in class and this can be a relevant question for the online students as well, the lecturer is responsible for putting the question and the answer on the discussion board.
It is advised that the lecturer sends all the students an e-mail at the beginning of the course to check if the students can log-in and if they have problems with this who they can contact. Students should	This has to be done first thing when the course is running.	The lecturer is responsible for sending the e-mail to all students. He should also watch if every student sends an e-mail back. The students are

all respond to this e-mail.		responsible for checking if they can log-in and then sending an e-mail back to the lecturer.
It is advised to deliver the learning material two lessons ahead.	This is while the course is running. The first two lessons have to be made available before the course starts.	The lecturer.
It is advised to make use of recorded lectures in an e-learning environment (video).	During the course, while the lecturer is giving the lecture, he can tape the lecture. He can put this the next day on the course website. This can't be done before the course starts, because the lecture has to be taped.	The lecturer.

3.3 Short term planning

Some recommendations do not need months of planning, but they need to be planned in before the course starts. These recommendations still need a lot of thorough thinking and are presented in table 9.

Table 9
Recommendations before the course starts (short term)

<i>Recommendation</i>	<i>Explanation</i>	<i>Who is responsible?</i>
If something new is submitted on the notice board, the students receive an email.	This lecturer makes out of a notice board a discussion board. He has to take the same steps as creating a discussion board; he only names it then 'notice board'. The setting of the notice board has to be that way that when something is submitted, an e-mail is send to the students. This setting can be done before the course starts.	The lecturer and the students. The students can indicate on the notice board if they want to receive an e-mail.
It is advised to submit the newest information on top of the notice board	The setting of the notice board has to be that way that when something new is submitted, this comes on top of the notice board. This setting can be done	The lecturer.

	before the course starts.	
It is advised to make use of hyperlinks in an e-learning environment.	Before the course starts, the lecturer has to look for good websites and add the hyperlinks in the course website. This may take some time, but it does not need a planning months before the course starts.	The lecturer.
It is advised to make use of simulations, especially role-play and case studies.	Before the course starts, the lecturer has to think of a role-play or a case study. Or he has to look on the Internet for examples of them. The lecturer should also work them out, so they are ready for use, also for the online students.	The lecturer.
It is advised to make use of recorded lectures in an e-learning environment (audio).	The lecturer has to create a script and a PowerPoint presentation. The lecturer can create these before the course and post them in the course website. He has to do this before the course starts, so he can take the time to make sure the lecture is recorded well. If the lecturer does not know how to do this, he has to make sure he gets this knowledge.	The lecturer.
It is advised to make use of PowerPoint slides with pictures, graphics and diagrams.	The lecturer should think about the way he puts the information in the PowerPoint slides. They have to be short, but still clear enough for the online students to understand them. He has to think about what pictures, graphics and diagrams he is going to put in, and look the right ones up on the Internet or in own files.	The lecturer.
It is advised to submit a document in the e-learning environment of how to work	The lecturer has to decide what document he is going to put on the course	The lecturer.

effectively in groups.	website. He can submit this document in the course website before the course starts.	
It is advised that the written material is more explicit in what steps have to be done to complete the assignments.	The lecturer creates the assignments before the course starts and he adds the assignment to the course website before the course starts. The written material should be made clearer.	The lecturer.
It is advised to submit more detailed course information on the universities website.	This is done before the course starts, because this information makes the students do the course. The information also helps the students to know what they can expect from the course.	This cannot be done right now, so it is necessary that the LMEF program director, dr. Tim Ferris, makes clear to the people higher up that it is necessary to put more information on it. Once this is possible, it is up to the lecturer to do this.
It is advised to put the buttons in the same order.	When the lecturer is creating the course environment, he should have a look at the right order for the buttons.	The LMEF program director, dr. Tim Ferris, has to make sure everyone has the right order for the buttons. The lecturer is responsible for using the right order.
It is advised to use the same format for the course outline.	When the lecturer is creating the course environment, he should have a look at the format he uses.	The LMEF program director, dr. Tim Ferris, has to make sure everyone has the right format. The lecturer is responsible for using the right format.

3.4 Long term planning

The recommendations presented in this section are recommendation that need a lot of time preparing them, or the recommendations need to go through an administrative process. This can take months and after the administrative approval the recommendations need preparing time before they can be used in the course. These recommendations are presented in table 10.

Table 10
Recommendations before the course starts (long term)

<i>Recommendation</i>	<i>Explanation</i>	<i>Who is responsible?</i>
It is advised to structure the discussion board by lesson.	This recommendation is not possible yet. The	The program director of the LMEF Masters

	Flexible learning Centre can make it possible to structure the discussion board, but they need approval from higher up. Somebody has to go to these people and ask for this approval.	program, dr. Tim Ferris, should go higher up and ask for approval. The Flexible Learning Centre has to make it possible for the lecturer to create these folders in the course website. When this is done, it is the lecturers' responsibility to create these folders.
It is advised that all students and the lecturer receive an e-mail when something has been submitted on the discussion board.	This is not possible yet, but the Flexible Learning Centre can do this. They need approval from higher up. Somebody has to go to these people and ask for this approval.	The program director of the LMEF Masters program, dr. Tim Ferris, should go higher up and ask for approval. The Flexible Learning Centre has to make it possible for the lecturer to put this option in for the students. The students have to take responsibility and make sure they choose the option that suits best for them.
It is advised to make use of online practice exercises.	It can take a lot of time to create a quiz or another online practice exercise. This is something the lecturer should really take time for.	The lecturer.
It is advised to make use of interactive animations	These animations have to be created. This can be done by the Flexible Learning Centre, another company or by the lecturer himself. The lecturer really needs to think what kind of animation he would like to have. This has to be done carefully and thoughtfully. If he is going to make an animation himself, he needs to learn how to do this.	The lecturer has to come up with an idea for an interactive animation. The Flexible Learning Centre, another company or the lecturer himself is responsible for creating it.
It is advised to have more face-to-face meetings for the OTE course.	DSTO does not want to offer the courses face-to-face to all students, so some students have to do the courses online. This is	The contact person of unit SEEC for DSTO, A/Prof. David Cropley, should do these negotiations with DSTO.

	something that should be discussed with DSTO, but this takes a long time of negotiating.	
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4 Costs

For a good realisation of the implementation plan it is needed to have some insight in the costs involved in the suggested improvements. These are appointed in this chapter, split up to non-recurrent (section 4.1) and structural costs (section 4.2).

4.2 Non-recurrent costs

The lecturer can create online practice exercises by himself. He can do that by attending a workshop offered by Learning Centre (given by Jodi Smith). This workshop can be attended for free. The lecturer can learn how to make an online practice exercise by doing a self-guided workshop on the Internet. Links to these workshops were provided in chapter 3. These self-guided workshops are for free. If the lecturer wants to do a professional workshop though, it will bring extra costs with it.

The lecturer can create an interactive animation by himself. He can use the link provided in chapter 3 to do a self-guided, free workshop. It will take several hours before the lecturer knows how to create an interactive animation. And after that it will take the lecturer more hours to come up with an idea for the animation and even more hours to create his idea. But when this is all behind, the animation can be used a long time.

If the lecturer hires a company like the Flexible Learning Centre to make an interactive animation, it will cost a reasonable amount of money. The costs depend on how big the animation is and how much time the designers spend on making the animation, but it can vary from AUD 1000 and AUD 10.000.

4.3 Structural costs

Calling students up, especially online interstate students, costs money. This can become a real cost, because these conversations can last for 20 minutes.

The use of a live virtual classroom will lead to costs made every time the course is running. The technical side needs to be paid (phone bill and if not available, the technical support to do a live virtual classroom) and the room needs to be reserved.

When more practice exercises are submitted in the course website, this may increase downloading time and time that the students spend on the Internet. This will increase their costs. For students who have a dial-up connection, this can be a negative side to the recommendations. The same can be said about recorded lectures with audio or video. But students can download these files at work, to decrease the downloading time at home and their costs.

When more face-to-face meetings are offered, it will bring more costs for the client, because the lecturer has to be paid for those hours. Students will most likely learn more though when they have face-to-face meetings.

Adding recorded lectures with audio or video in the course website can be a structural cost. It depends if the lecturer changes things between two courses about the PowerPoint slides. If he changes things (and that is most likely), he has to make sure the PowerPoint slides and the belonging audio are still up-to-date. The same can be said about recording with video. The

lecturer has to arrange a camera and somebody who can look after the filming while the lecturer is presenting. This person can be a student or somebody from the supporting staff.

Other costs that should be considered is that the majority of the suggested recommendations take more time for the lecturer to prepare the course and to work on the course while it is running. This does not really cost more money, but because of this he can do less to other courses or other projects. This may cost money in the end.

When the lecturer decides to give all students a Compact Disk (CD) with the PowerPoint slides that contain audio and video, assignments, articles and references, these need to be bought. These CD's need to be burned, this costs time and time is money. The lecturer can burn it, but he can also ask somebody of the supporting staff to do it for him. The distribution of the CD's is also a cost factor, because all the interstate students need to get it by post. The local students can receive the CD in the first meeting, but still, when students cannot attend the first meeting, then they need to get it by mail as well.

5 Risks

To implement the suggested recommendations within the two courses RMME and OTE, and also within unit SEEC, the chance of succeeding depends mostly on the time and effort spent by the lecturers on it. The succeeding of the recommendations depends on these critical factors. Another critical factor is money. In this chapter these critical factors are discussed.

The self-guided workshops and the workshop run by the Learning Centre do not cost money. The making of an interactive animation can be practiced for free via the suggested links in chapter 2.

Lecturers can use each others knowledge. The lecturer of the OTE course has experience in making recorded lectures with audio in it. Both lecturers can go to their colleague A/Prof. Joseph Kasser. A/Prof. Joseph Kasser has a lot of experience and knowledge about distance learning.

When lecturers want to qualify themselves in making interactive animations, recorded lectures or online practice exercises such as quizzes, they must take the time to really learn. If they need to do a workshop, they should make that effort and do that workshop. Thinking of an idea for the practice exercise or an interactive animation takes a lot of time, even more when the lecturer is going to create it himself. He should be realizing that and take that time.

When students have submitted their personal background information, the lecturer should make the effort to read this information and deal with it in examples or explanations.

Stimulating the use of the discussion board is a recommendation that can only succeed if the lecturer makes the effort to do the advised recommendations.

The lecturer is the one who has to spend some time on structuring the discussion board into folders. If he does not do this, nobody will.

The big risk is that the lecturers start preparing and organizing the course one or two weeks before the course starts. This is too late for most recommendations. As was shown in chapter 3 of this implementation plan, some recommendations need a long term planning and some a short term. Even when the course is running, a lot of time has to be spend on keeping all the information up-to-date and as recent as possible. The lecturer also has to make sure that he responds to questions within 3 business days and that he marks assignments within 3 weeks. If the lecturer does not take these recommendations into account, and does not plan this in his personal agenda, or just does not do these, then the recommendations are most likely to fail.

When using these recommendations it is important to keep in mind that the next time when the course is running, some recommendations can be hardly used. Lecturers can then think of removing for example the practice exercise, or the recorded lecture with video. But the students in the course after the first course can have totally different learning styles. They may prefer to use online practice exercises, or learn a lot from interactive animations.

6 References

- Barton, J., Heilker, P. & Rutkowski, D. (2005). *Fostering effective classroom discussions*. Retrieved October 19, 2005, via Virginia Tech: <http://www.mhhe.com/socscience/english/tc/discussion.htm>.
- Brennan, R.E., McFadden, M. & Law, E. (2001). *Review of research. All that glitters is not gold: online delivery of education and training*. Leabrook: NCVER.
- Dempster, M., & Raff, D. (1992). *Class discussions: a powerful classroom strategy*. Australia: Hawker Brownlow Education.
- Desimone, R.L., Werner, J.M. & Harris, D.M. (2002). *Human Resource Development*. Third edition. Harcourt College Publisher: Orlando.
- Driscoll, M & Carliner, S. (2005). *Advanced web-based training strategies*. San Francisco: Pfeiffer.
- Hamlin, J.S. (1999). *Effective web animation: advanced techniques for the web*. Massachusetts: Addison Wesley Longman.
- Herreid, C.F. (1997). What makes a good case? Some basic rules of good storytelling help teachers generate student excitement in the classroom [electronic version]. *Journal of College Science Teaching*, (12) 163-165.
- Herreid, C.F. (1998). Return to Mars. How not to teach a case study [electronic version]. *Journal of College Science Teaching*, (2). Retrieved at October 10, 2005, from: <http://ublib.buffalo.edu/libraries/projects/cases/teaching/mars.html>.
- Kasser, J. (2005). Professional Teaching Practice Workshop: Think async!
- Kessels, J.W.M. & Poell, R.F. (2001). *Human Resource Development. Organiseren van het leren*. Samsom: Groningen.
- Lynch & Horton (2002). *Use for GIF and JPEG files*. Retrieved October 15, 2005, from <http://www.webstyleguide.com/graphics/summary.html>
- Massachusetts attorney General's Office. Retrieved October 18, 2005, from: <http://www.ago.state.ma.us/sp.cfm?pageid=1995>
- McVay Lynch, M. (2004). *Learning online: a guide to success in the virtual classroom*. New York: RoutledgeFalmer.
- McVittie, J. (2005). *Role play*. Retrieved October 18, 2005, from: <http://www.usask.ca/education/coursework/mcvittiej/methods/role.html>
- Moran, J.J. (1997). *Assessing adult learning. A guide for practitioners*. Florida: Krieger Publishing Company.
- Nielsen, J. (2004). *Guidelines for visualizing links*. Retrieved October 17, 2005, from: <http://www.useit.com/alertbox/20040510.html>
- Office for Domestic Preparedness (2003). *ODP Approach for Blended Learning*. Retrieved September 12, 2005, from: <http://www.ojp.usdoj.gov/odp/blendedlearning/pdfs/bls.pdf>.
- Palloff, R.M. & Pratt, K. (2003). *The virtual student. A profile and guide to working with online learners*. San Francisco: Jossey-Bass.
- Palloff, R.M. & Pratt, K. (2005). *Collaborating Online. Learning together in community*. Jossey-Bass: San Francisco.
- Reilly, T. (1999-2005). *How to run effective role-play*. Massachusetts attorney General's Office. Retrieved at October 18, 2005, from: <http://www.ago.state.ma.us/sp.cfm?pageid=1995>.
- Reed, J. & Koliba, C. (1995). *Facilitating reflection. A manual for educators and leaders*. Retrieved at October 25, 2005, via University of Vermont: http://www.uvm.edu/~dewey/reflection_manual/.

- Scratch media (2005). *Clear hyperlinks*. Retrieved October 17, 2005, from:
http://www.webdesignfromscratch.com/clear_hyperlinks.cfm.
- University of Amsterdam (2005). Retrieved at October 18, 2005, from:
<http://www.fee.uva.nl/docentenhandleiding/object.cfm/objectID=4583FFA0-EA30-4387-B286B47CF7A73628#paragraaf2>.
- Virtual University (2005). *Guidelines for professors/consultants*. Knowledge beyond boundaries. Retrieved at October 18, 2005, from: <http://www.vu.edu.pk/Guidelines.html>.
- Vos, H. & Vlas, H. (2000). *Reflectie en actie*. Retrieved at October 25, 2005, via University of Twente, DINKEL Instituut / Faculteit der Elektrotechniek:
<http://www.utwente.nl/itbe/owk/publicaties/onderbouwing/doc00-07.pdf>
- Williamson, A. (2000). *Internet animation*. Wairua consulting. Retrieved 14-10-2005, from: http://www.wairua.co.nz/publish/web_animation.html#Design%20Versus%20Usability.