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## MASTER'S THESIS

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| Writer: Alexey Fedorov  | <br>.....<br>(Writer's signature) |
| Faculty supervisor: Jayantha Prasanna Liyanage<br><br>External supervisor(s): Torunn Landr ak Kleivenes, Jan Jonkers  |  |
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Alexey Fedorov

## **ABSTRACT**

The main objective of this research is to identify the possible gaps and improvements of E-learning module that implemented in Skretting company. The literature review was done to understand the meanings of competence and knowledge management aspects but also to clarify terms, elements and challenges of E-learning tool in general. A case study was implemented based on data collection through Skretting management interview and personnel questionnaire from different countries where Skretting has its production assets. The management interview was conducted to three managers from different Skretting departments where all of them have expressed their own professional opinions regarding Skretting training strategy. The questionnaire was aimed to identify the quality of the main three elements (technical design, content design and learning process) of E-learning module based on personnel opinions. All received results from the interview and questionnaire were discussed in details in this master's thesis. Recommendations as a deliverable part of the research are presented at the end of the thesis where the main aim is to improve the effectiveness of E-learning module that can be used to train Skretting production personnel. The full versions of the interview and questionnaire illustrated in appendixes A and B at the end of the thesis work.

**Keywords:** Knowledge Management, Competence Level, E-learning Tool, Questionnaire, Interview, Content Design, Learning Process, Technical Design

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## **1.0 INTRODUCTION**

### **1.1 Background for the Thesis**

At present day a workplace is changing and developing continuously and this is modern workplace demands from personnel to be high educated, adaptable and multi-disciplined with ability to work collaboratively. Technical personnel must meet these demands of the workplace and have communication skills to operate in today's competitive, fast-moving and global technical environment (Antonova, et. al, 2006; Liebowitz & Frank, 2011). Furthermore, personnel have to remain the productiveness of organization and routinely keep abreast of technological advances for their day-to-day working environments (Yvette, 2007). Accordingly, Skretting company has implemented a module of E-learning tool to ensure and help its personnel to face all these not simple requirements. A module may be as a possible solution to facilitate more flexible, distributed, collaborative, self-directed and more virtual learning environment for its work-based professional personnel.

Skretting is the world leader in the production and supply of feed for farmed fish and shrimp. Total annual production of high feeds is approximately 1.3 million tones. Skretting has operating companies on five continents to produce and deliver feeds. Nowadays, Skretting is interested to implement different E-learning modules as a part of training strategy of organization. Management of Skretting is convinced that modules and topics through E-learning tool could bring priceless knowledge, cost and time effectiveness for organization but also a continuous training of the personnel that could provide their high competence generally. In addition, E-learning tool has acquired more functions in the learning process. Personnel can gain knowledge through materials and information that available via online. E-learning tool covers significantly more participants than regular training by face-to-face course and provides distance flexibility where all learners can study at a time, place and pace that suited their convenience (Naidu, 2006).

### **1.2 Problem Definitions**

Skretting is a growing worldwide aqua feed production company and it has evolved from a traditional manufacturing company to a knowledge based company. Fast developing technologies, equipment and systems that are used in Skretting require personnel to be operated but these personnel must have specilized knowledge and skills to provide high production outputs. Therefore, personnel training is one of the important aspects for Skretting. Furthermore, training plan must give knowledge and information in a widely dispersed way. Thus Skretting is interesting to train its personnel in that way where each of them could be competence on workplace. Such approach of organization in learning process makes management of Skretting to find different types of personnel training. One of these training types is module of E-learning tool that just implemented in organization as test version. A module needs to be analyzed and dicussed in details before to use fully.

### **1.3 Objective/Goals**

According to problem discussion of the thesis in previous subchapter the main objective of the research is to develop recommendations to improve the effectiveness of implemented E-learning module in Skretting through the following steps:

1. Perform literature research to identify specific theories, recommendations and the best practices related to E-learning.
2. Pre study of the existing E-learning module in details.
3. Collect data through interview and questionnaire.
4. Analysis and discussion of the results.



## 1.4 Limitations

As described in figure 1-1 the thesis consists of four main parts that described into seven chapters. The first part is an introduction of the subject and the thesis. The second one gives a theoretical background on the organizational competence development, knowledge management and E-learning tool. The third part of this thesis is research of E-learning module in Skretting organization based on methodology where it consists of management interview and personnel questionnaire. And the last part of the thesis focuses on discussion and conclusion of obtained research results but also illustrates recommendations as guideline of E-learning module improvements.

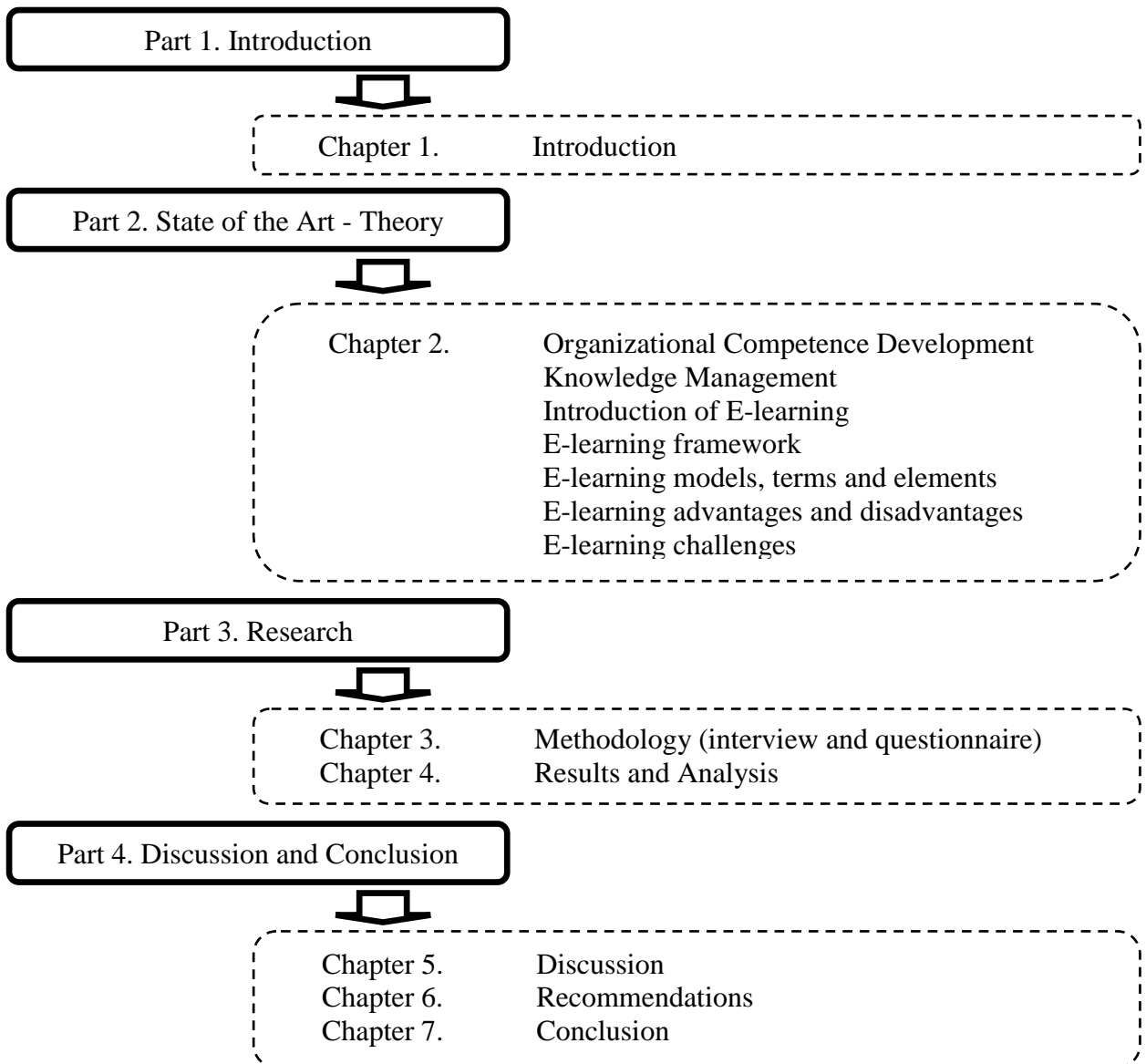


Figure 1-1. Limitation Framework of Thesis

## 2.0 STATE OF THE ART

### 2.1 Organizational Competence Development

Any organization is considered as a pool of resources, capabilities and different types of competence that are needed to produce physical products and services (Baroni de Carvalho, et al, 2007). For instance, enterprises that operate in production sector pay their attention on the goals. Activities that performed by companies must bring the expected results; otherwise there is no reason to do people, technological and financial investments. In our days it is much harder to reach desired goals than a few decades ago because there are a lot of issues that significantly affect on achievement of organization goals. Some of those issues might be information and communication technology, speed of innovation and shorter cycle times, specialized knowledge and personnel skills, and constantly increasing requirements of customers and market (Ley, 2006). But however all these issues can be managed quite effectively through certain approaches of company and one of these approaches is *organizational competence*. Competence implies that managers and personnel must have specialized knowledge and skills that are necessary for company to perform a job in technical and cost effectiveness ways. They have to respond to all requirements of the market and customers. Development and demonstration of employees' capabilities on all required levels in organization give an opportunity for company to reach identified goals. Thus, based on these statements of the competence, it is necessary to say that professional knowledge and skills of personnel can be achieved not only by performing a job and getting work experience but also through systematical and continuous personnel trainings. Consequently, organization must provide different types of trainings for its employees (ITAP, 2011).

#### 2.1.1 Elements of Competence

According to Ley's (2006) definition of competence, it is an ability of personal to perform a job on required level in different work specific situations that are controlled by employee and that are useful for goals of company. Consequently, it can be noted that any job requires some specified approach performance from personnel but to use this approach effectively personnel must have additional knowledge and ability in different professional areas. But whatever area is management meets four main competence elements on workplace and should follow them if they want to perform a job well. In this case, Drejer (2000) illustrates four main elements of competence in his work.

First of them is *technology element*. Technological element means about advance production processes that are used in company where complicated processes require the following management approaches:

- Development the correct labor division in continuous way
- Using an automated production cycle
- Provide a high quality of end products

These approaches lead a company to distribute different types of production technologies. Thus, it can be noted, in this case, that technology is physical tools and systems such as machinery, equipments, databases and software programs.

Second one is *human element*. Today organizations try to use modern technology to be advanced in a market but to utilize a technology with high performance parameters and outputs personnel need to be educated where each employee has knowledge that fits to work discipline where he performs a job. In other words, employees should know a work principle of different equipment, tools and machinery. Seeing a direct link between human and technology Drejer (2000) states that if people won't use technologies then nothing happens in effective way. Such wise,

personnel in organization is considered as a central point of organization competence. In other words - staff decides everything.

The next competence element is *organization*. According to present tough environment of competitiveness, a company has to work smarter, faster and cheaper if it wants to survive and stay in a market. Organization competence helps to align the human capital assets together with business strategy to make an organization value and to drive a high performance of human forward in market (Durgin, 2006). To provide these two issues effectively, organization managers have to build a business strategy based on competencies and develop a clear relationship between competencies and competency planning.

And final element in this subchapter is *culture*. Culture element of competence is a set of suitable behaviors, relationships, policies that come together in one organization system. A system allows organization management to perform an effective work through all existing cultural situations in a company. Culture element is expressed by a model of human behavior where it consists of language, thoughts, communications, actions, customs, beliefs, human values, ethic and different social groups of people. In addition, this element helps to obtain information regarding each existing type of culture. It is needed to reach the goals of organization through personnel understanding, their awareness and human values (HSS, 2011).

Thereby, based on all meanings of these four competence elements, I may conclude that competence of organization is needed to have a high capacity to produce products or to perform a service in effective ways through individual and organizational efforts.

## **2.2 Knowledge Management**

First of all, it is necessary to give the definition of knowledge management. Liebowitz and Frank (2011) state that knowledge management is a process that refers to creating, acquiring, aggregating, sharing and using knowledge to increase learning and work performance in an organization.

Secondly, Gao (2008) adds that knowledge management has in itself complex different meanings such as management terms and types of knowledge that are needed to understand how to manage effectively the flow of information. In turn, Halawi (2006) asserts that knowledge management contributes an applying of different systematic methods to find and understand knowledge and after that use it to create necessary values to reach goals faster and cheaper for organization.

And finally, in 1989 the most CEO has agreed that knowledge has more fundamental value than success of enterprise and its all activities. They said that enterprise validity straight depends on competitive quality of knowledge and how they exploit it successfully and believe that sharing of knowledge in effective way is very important to gain a competitive advantage in a market. Hence, it can be argued that development of personnel and organization competitiveness is a crucial key to achieve a successful management organization. But on the other hand, organization competitive advantage is acquired gradually in long term through the determined efforts of employees and managers where organization advantage might be reached by having an access to needed knowledge that can be used successfully in organization (Drucker, 2005; Wiig, 1997). Wiig's in his own work (1997) has shown a way of knowledge asset formation in organization (table 2-1). This table illustrates functions of managers and personnel, i.e. which activities have to be done in organization to build knowledge asset which can be used effectively in achieving of company goals.

| <i>Maximize the enterprise's knowledge-related effectiveness</i>                   |   |  |  |
|--|---|--|--|
| <i>Management Functions</i><br>Monitor and Facilitate Knowledge-Related Activities | <i>Staff Functions</i><br>Establish and Update Knowledge Infrastructure | <i>Operational Functions</i><br>Create, Renew, Build and Organize Knowledge Assets | <i>Realize the Value of Knowledge</i><br>Distribute and Apply Knowledge Assets Effectively |

Table 2-1. Four Areas of Knowledge Management Emphasis (Wiig, 1997)

The main purpose of knowledge management is connecting people to allow them to think all together. Take time to make information clearer and share it between each other. By sharing of knowledge can be understood when where one person keeps knowledge and other one knows where knowledge can be used. But to perform this effectively, organization management has to manage knowledge over time (Hicks, et. al, 2007). This process of knowledge management lets employees to know that they are useful to others in their community (Lang, 2001). Based on this, organization leaders purchase different methods and try to find approaches to create and generate a priceless value from knowledge asset for their organizations. In this case, it is necessary to say that some top managers of international enterprises have following opinions regarding knowledge: “if you well informed then you are armed or good knowledge is power”. So, it can be concluded that sometimes knowledge might have priceless value for a person and organization.

Accordingly, based on purpose explanation and definition a goal of knowledge management can be identified. A goal of knowledge management is to deliver right information to right persons at the right time in a company that can give guarantee they can take right actions to perform a work and increase performance of organization (Liebowitz & Frank, 2011). Also, good implemented knowledge management gives for company an access to important information that is needed to perform tasks, much better than a company has done in the past. But on the other hand, knowledge management does not provide for company ready answers or problem decisions that can be used in organization, it only contrary facilitates a learning of the correct answers through enterprises (Call, 2005).

And finally, if refer to the work of Greiner (2007) then there are two main objectives of knowledge management: *efficiency* and *innovation*. By *efficiency* he means about externalization and re-use of knowledge where the main focus is on processes of organization. All using processes, an organization manages by using codification strategy. The purpose of this strategy is collection, database storing and dissemination of knowledge. It is needed for company to provide an available and useful knowledge in explicit and codified forms of documentation. For example, workflow design, documentation management and organization database are considered as a part of codification strategy. When managers say about *Innovation* then creativity and knowledge creation are discussed by them. The main focus, in this case, lies on people, on employees because knowledge needs to be transferred, people need communicate between each other and exchange their knowledge by using network where tacit type of knowledge is utilized. For example, communication and knowledge exchange can be implemented through different discussion forums. Personalization strategy is used if company wants to generate new specific and various solutions for its customers. Table 2-2 illustrates a brief content of each knowledge management objective. In the next subchapter tacit and explicit knowledge will be discussed in more details.

| <i>Objective</i> | <i>Innovation</i><br><b>Creativity and knowledge creation</b> | <i>Efficiency</i><br><b>Externalization and re-use of knowledge</b>       |
|------------------|---|---|
| Focus            | People  | Processes   |
| <i>Strategy</i>  | <i>Personalization</i><br>Networking and dialogue             | <i>Codification</i><br>Collect, store, and disseminate explicit knowledge |
| Problem          | New, unstructured, not repetitive                             | Repetitive activities and similar processes                               |
| Knowledge type   | Tacit knowledge   | Explicit knowledge  |

Table 2-2. Two Main Knowledge Management Objectivities (Greiner, et. al, 2007)

### 2.2.1 Knowledge

According to the law of time, the knowledge is always increasing in its scope. Knowledge belongs to corporate assets like management system, customer information and corporate reputation. Knowledge seems invisible; it can't be touched and physically carried out. But on the other hand, it clearly drives the bottom line. When purposes and focuses are applied on some mission then a value of knowledge becomes higher and essential. Today knowledge is one of important assets exists and its price is cultivating in the context of the organization strategy. For example, when time comes out to merge two or more companies in one huge corporation or even when a company changes its organizational culture then a priceless knowledge which has been achieved other the years is lost or removed by new other information. In such situation, skills, resources and valuable knowledge of employees who work in this organization leave together with merger. Thus, these personnel never use their wealth and accumulated knowledge (Smith, 2001).

Nowadays many definitions of knowledge can be found anywhere, in internet, journals or books but most of knowledge definitions are specific in context and it depends on used area: cognitive science, management, theology and knowledge engineering (Abdullah, et. al, 2006). However one general definition was presented by Schreiber (2000):

*“Knowledge is the whole body of data and information that people bring to bear to practical use in action, in order to carry out tasks and create new information. Knowledge adds two distinct aspects: first, a sense of purpose, since knowledge is the “intellectual machinery” used to achieve a goal; second, a generative capability, because one of the major functions of knowledge is to produce new information. It is not accidental, therefore that knowledge is proclaimed to be a new “factor of production.”*

As I mentioned before in previous subchapter of this thesis, there are two kinds of knowledge and they are both used in organization depends on objectives of knowledge management. So, next subchapter will focus on explicit and tacit knowledge.

### 2.2.2 Explicit Knowledge

Explicit knowledge is knowledge that can be clearer, traceable and unequivocal through person abilities. This type of knowledge can be presented or illustrated in forms of documentation, database and some manuals. These forms make knowledge to be readily transferable within of organization and between employees without losing of knowledge meaning (Helm Stevens, et. al, 2010). Hereby, explicit knowledge might be understood as something that may be clear

explained by one person to another or group of people where each individual has the same knowledge meaning (Sanchez, 2000).

One of advantages of explicit knowledge is easier to occupy and distribute knowledge to needed people. It is possible to perform because explicit knowledge is available to be passed on in form of tangible materials. The idea of tangible materials is that knowledge can consist of numbers or words or shared in different forms of data. And thence, explicit knowledge can be applied through formulas, manuals and all possible specifications that described in formal language. In this case, all these formulas, manuals, drawings and other visual forms are considered as tools of knowledge transformation between all personnel in organization. Consequently, the following conclusion can be made: processes that utilized in organization should help individuals to express their knowledge and build knowledge asset for organization.

### **2.2.3 Tacit Knowledge**

Tacit knowledge is a specific and personal knowledge in contrast with explicit knowledge. It is difficult to formalize and articulate, communicate and estimate, capture and code adequately into a set of rules for knowledge-based system (Greiner, et. al., 2007; Abdullah, et. al., 2006). But also, tacit knowledge can be understood as intuitive and practice-based. In this case, intuitive and practice-based knowledge is difficult to pass to other people (Stover, 2004). The reason of complexity is inability of tacit knowledge to be quantified easily and this makes information difficult to transmit between persons (Stevens, et. al., 2010).

Tacit knowledge is gained by internal actions and processes of organization. Some of them can be experience, reflection and individual talents. And therefore, tacit knowledge can't be managed and taught in the same way and manner as explicit knowledge (visualization, articulation and codification). Tacit knowledge can't be given in lectures, conferences and it can't be found in database, documentations, manuals and letters. Such opportunity of tacit knowledge to be presented says about impossibility to separate, store and distribute the whole knowledge of person to other. But tacit knowledge can be stored in human beings and shared through face-to-face social interactions and practical experiences (Greiner, et. al, 2007). For instance, when a person has tacit knowledge then he is considered as unconsciously skilled and who knows something so well that he is unaware of what he needs to do to be successful. Depending on the person and the situation, tacit knowledge may be used in different contexts and orientations. Context can be divided in local and global terms where local terms say about when tasks that are done at hand, and global means about how the current situation fits into the larger picture. Orientation is described as pragmatic and ideal (Smith, 2001). Tacit knowledge is used by organization when a specific problem is being and it needs a creative and analytical rigorous advice to be solved. Through using of tacit knowledge, organization can improve its efficiency of making decisions, production cycle and task performance (Haldin-Herrgard, 2000).

### **2.2.4 Summary of Tacit and Explicit Knowledge**

Thus, based on discussions of these two types of knowledge a short summary can be illustrated in table 2-3 through categories such as work process, learn, teach, type of thinking, share of knowledge, motivation, reward, relationships, technology and evaluation. All these categories show differences between explicit and tacit knowledge.

| <b>Category</b>           | <b>Explicit knowledge</b>  | <b>Tacit knowledge</b>  |
|---------------------------|--|---|
|                           | <i>Knowing about (objective knowledge, that is described in formal language, print or electronic media, often based on established work process, use people-to-documents approach)<br/>Rationalization of facts; formal methods<br/>Easy to codify, transfer and reuse</i> | <i>Knowing how (subjective knowledge, based on practice, acquired by personal experience, seldom expressed openly, often resembles intuition)<br/>Systems of ideas, perceptions, experience<br/>Difficult to transfer</i> |
| <b>Work process</b>       | Organized tasks, routine, orchestrated, assumes a predictable environment, linear, reuse codified knowledge, create knowledge objects  | Spontaneous, improvised, web-like, responds to a changing, unpredictable environment, channels individual expertise, creates knowledge  |
| <b>Learn</b>              | On the job, trial-and-error, self-directed in areas of greatest expertise, meet work goals and objectives set by organization  | Supervisor or team leader facilitates and reinforces openness and trust to increase sharing of knowledge and business judgment  |
| <b>Teach</b>              | Trainer designed using syllabus, uses formats selected by organization, based on goals and needs of the organization, may be outsourced  | One-on-one, mentor, internships, coach, on-the-job training, apprenticeships, competency based, brainstorm, people to people  |
| <b>Type of thinking</b>   | Logical based on facts, use proven methods, primarily convergent thinking  | Creative, flexible, unchartered, leads to divergent thinking, develop insights  |
| <b>Share of knowledge</b> | Extract knowledge from person, code, store and reuse as needed for customers, e-mail, electronic discussions, forums   | Altruistic sharing, networking, face to face contact, videoconferencing, chatting, storytelling, personalize knowledge  |
| <b>Motivation</b>         | Often based on need to perform to meet specific goals  | Inspire through leadership, vision and frequent personal contact with employees   |
| <b>Reward</b>             | Tied to business goals, competitive within workplace, complete for scarce rewards, may not be rewarded for information sharing   | Incorporate instinct or non-monetary motivators and rewards for sharing information directly, recognize creativity and innovation   |
| <b>Relationships</b>      | May be top-down from supervisor to subordinate or team leader to team members  | Open, friendly, unstructured, based on open, spontaneous sharing of knowledge   |
| <b>Technology</b>         | Related to job, based on availability and cost, invest heavily in IT to develop professional library with hierarchy of database using existing knowledge   | Tool to select personalized information, facilitate conversations, exchange tacit knowledge, invest moderately in the framework of IT, enable people to find another  |
| <b>Evaluation</b>         | Based on tangible work accomplishments, not necessarily on creativity and knowledge sharing  | Based on demonstrated performance, ongoing spontaneous evaluation   |

Table 2-3. Explicit and Tacit Knowledge (Abdullah, et. al., 2006; Smith, 2001)

## **2.3 Introduction to E-learning**

Today, e-learning tool is most used training technology in many organizations. It allows getting personnel to get necessary materials and knowledge through modules of E-learning tool. The main requirement of E-learning tool is just a person has to have a computer device and network connection. At present day E-learning tool is presented by two methods of training. First of them is internet-based training. In this situation, to be trained through internet-based training method of E-learning tool an internet connection is needed. Second method is computer-based training where a portable computer device is only needed for personnel training process. These two different training methods will be discussed in further in details, in other subchapter.

Thus, based on brief introduction of E-learning tool it should be noted that the main aim of E-learning. According to Anastasiu's (2008) statement the main aim lies on giving more independent and greater autonomy regarding the point in time for all learners where content and each method of E-learning are provided based on learning demand. Module content of E-learning tool is transferred through internet communication, video and audio in digital format, but also a satellite TV and different memory devices such as compact disc and memory flash cards that the most used today. E-learning exploits the web and all its associated rich technologies such as streaming and multimedia, Java and database replication. All these technologies of web are needed to produce not only trains, but also does delivering the real business benefits for organizations (MacEke, 2000).

## **2.4 Defining of E-learning**

According to scientific papers of two authors, Liebowitz and Frank (2011), E-learning tool can be determined as collection and knowledge use that distributed and facilitated by all possible electronic means. But however, to make clearer representation and understanding about E-learning, it is needed to give some definitions of it. Consequently, three different E-learning definitions presented below:

### *Definition 1*

Naidu (2006) states that E-learning is commonly referred to the intentional use of networked information and communications technology in teaching and learning.

### *Definition 2*

The American Society for Trainers and Development (ASTD) defines that e-learning is instructional content or learning experiences delivered en enabled by electronic technology.

### *Definition 3*

Anastasiu (2008) identifies that E-learning is all forms of electronic supported learning and teaching, which are procedural in character and aim to effect the construction of knowledge with reference to individual experience, practice and knowledge of the learner. Information and communication systems, whether networked or not, serve as specific media to implement the learning process.

## **2.5 E-learning Framework**

Since E-learning tool is focused on personnel training, it consists of many categories. These elements might be pedagogical, technological, interface design, evaluation, management,



resource support, ethical and institution. Each of them has its function and utility in using of E-learning tool. Figure 2-1 shows all these important categories that presented as one whole E-learning framework.

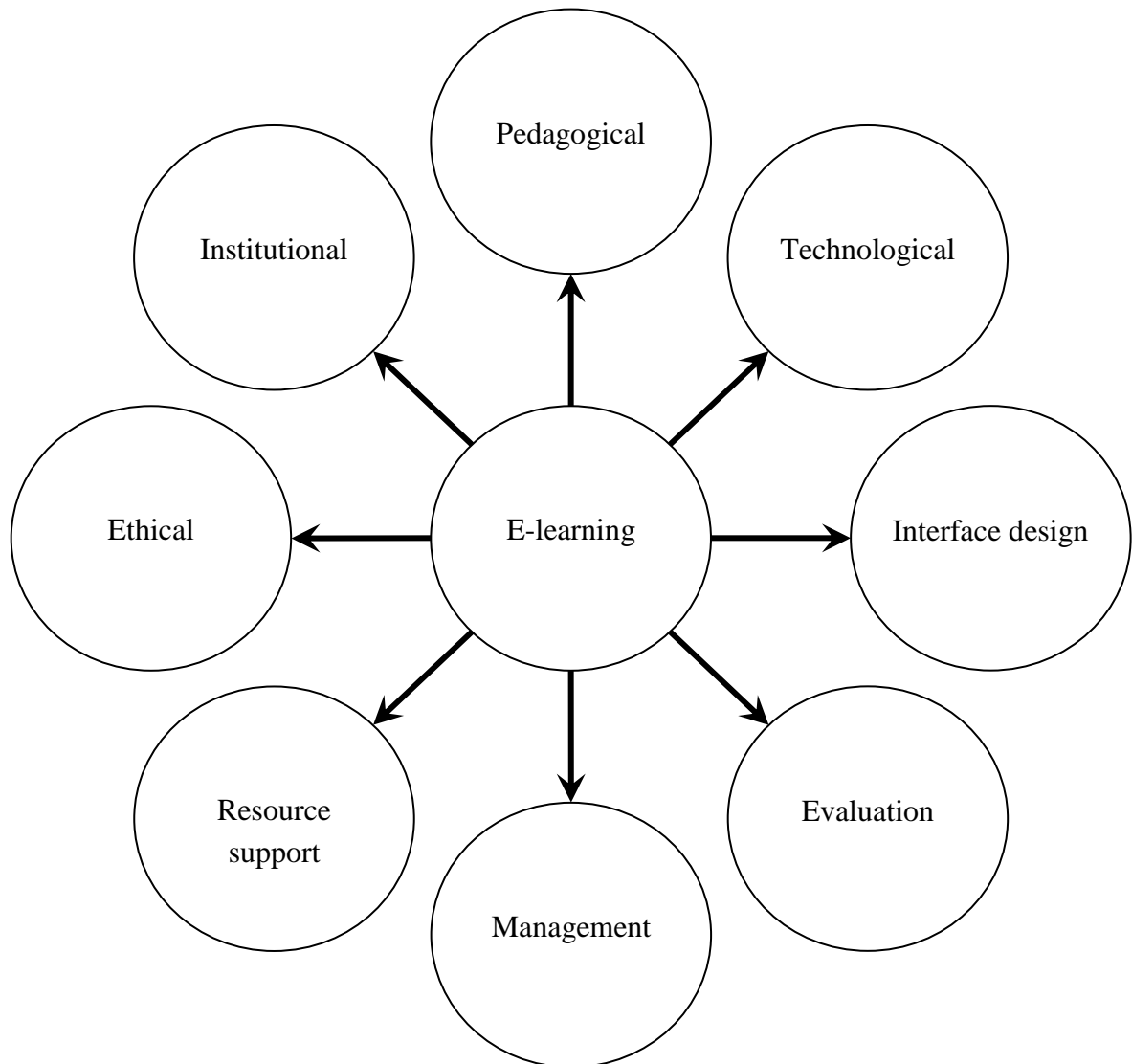


Figure 2-1. E-learning Framework (Noirid & Srisa-ard, 2007)

For example, *pedagogical* category refers to teaching and learning processes with attention on issues like content, audiences, goal and media analysis; design approach; organization and methods and strategies of e-learning environment. In turn, *technological* category addresses to infrastructure planning, hardware and software. *Interface design* links to overall look and feel of e-learning. The *interface design* includes web page and site design, content design, navigation and usability testing. As for *evaluation* then it includes assessment of learners, evaluation of the instruction and learning environment. *Management* refers to the maintenance of learning environment and distribution of information. Next category, *resources support*, studies the online support and resources that required the meaningful learning environments. *Ethical* category connects to social and political influence, cultural diversity, geographical diversity, learner diversity, information accessibility, etiquette and the legal issues. And finally the last category of E-learning framework, *institutional*, refers to issues of administrative and academic affairs, and student services related to e-learning.

## 2.6 E-learning Models

There are three types of E-learning models such as adjunct, mixed and online modules. As for *adjunct model* then it is based on traditional learning process together with capabilities of communication between the learners and the instructor in continuous basis. The main tool for communication between all participants in learning process is computer device that enable to hold discussion, hand in exercises, carry out collaborative learning learners and transmit information from the instructor to the learners. The possibilities that used in the internet let instructors to give learners tasks based on the vastness of the information included on the web and also allows to use the resources that available in the network. The resources can be considered as study materials in the course. *Mixed model* can be utilized in two different possibilities. The first one is using of network where purposes are simulation and role-playing. And the second possibility is mutual assessment of each other's work (Rashty, n.d.). *Online module* is used when all interactions between participants in the course are executed by using of communication network and computer devises. All materials such as a streaming video and audio, hyperlinked course materials, text and images are delivered only online (Noirid & Srisard, 2007).

## 2.7 E-learning Terms

As I mentioned at the beginning of E-learning chapter two terms of E-learning tool, namely computer-based training and internet based training will be discusses in this subchapter.

### 2.7.1 Computer-Based Training

Computer based training (CBT) is understood as self-directed and self-paced by each participant of training course or program and it is based on interactive coursewares and hypertexts. For example, an interactive course allows learners to exchange information and knowledge together with a computer software program. As for hypertexts then they are used to provide multiple connected pathways through information body where user has an access to jump easily from one topic to another. In this case, an interaction can be reached by clicking mouse bottom, keyboard pressing, screen touching or any other inputs from learners (Scholz & Thorbeck, 2000). In other words, CBT is a providing interactive instructional experience with using a computer where it seen as a primary mode of instruction. Today, CBT becomes more and more exciting as technology that includes multimedia, animation and web delivery. All these contents of CBT technology allow organizations to create an engaging of training process and effectiveness of personnel training (MacEke, 2000).

In addition, CBT can provide a highly motivating learning experience through using of adaptable materials. But from on the other hand, CBT requires exploitation of features to support and delivery E-learning tool to be used effectively and therefore Clarke (2001) illustrates the following seven main features of CBT:

1. Presentation and combination of multiple media (graphics, sound, animation, video and text).
2. Adaptability (able to change to suit the needs of learners, style and pace).
3. Dynamic display (windows, scrolling and hypertext links).
4. Memory (record learners' reactions, test results and pattern of learning).
5. Patience (computers make no judgment if learners need many attempts to understand the content).
6. Tirelessness (never need to take a break or go on holiday).
7. Interactivity (able to respond to the learners' reactions, behavior and choices).

He also argues that CD-ROM, Floppy DVD and any storage memory cards that can run on computer device are the main tools of CBT. The key elements of CBT might be installation on common platforms. In this case, there is no instructor or expert, all individuals can be trained through different interactivities that presented in forms of questions and answers, quizzes, simulations requiring learner inputs, packaging on media (CD-ROM, Floppy, DVD and video). Multiple media also might be used by using of text, graphics, audio, video, animation and simulations.

Thus, based on discussion and statements of some authors who work in this field, the advantages and disadvantages might be following. The main advantages that exist in CBT are: anytime and anywhere training and not depend on schedules and specific locations; learning process is performed at convenience and pace of learners, online testing and quizzes after training processes; easy navigation and online help; enables an organization to provide geographically diverse customers easy access to its services and enables an organization to give customers refresher or follow up training even after they have left the classroom. Disadvantages of CBT are much less but they are quite significant for organizations: high lead time to develop and market and high costs and effort required to update; lack of detailed and generally acceptable standards on what CBT should be and highly individualized training can mean inconsistent results.

In the end it may be noted that high level of interactive between all participants depends on who good performed a design of CBT. Good level of personnel understanding about material or content of module can be reached through topics, quiz questions and tests, and even some module assignments but all these learning types need to be built with high quality in CBT (Kashyap, 2011).

### **2.7.2 Internet Based Training**

Internet based training (IBT) is any form of online training through the web page to each individual or group of learners. Online training is a suite of program tools that allow management to range and facilitate learning and teaching activities and services. In complicated and large operations, online learning or training management system can decrease costs and save time. The main key elements of IBT can be online registration, online content delivery, online testing and quizzes, module navigation, content review, time and session independent training. Chats and e-mail are used to make personnel discussion through IBT.

According to personal opinion of Naidu (2006) advantages of IBT can be following: anytime and anywhere learning where learners do not have to be present in the classroom; access to related information from other participants of learning process and sites; mote training tools and materials available according to lesser dependence on specific platforms; time for updating, effort and cost are significantly reduced and reduced development and distribution costs. Also he finds three following disadvantages: IBT can miss out on key activities such as live interaction with peers and classroom discussions; IBT can become monotonous as there are restrictions on the amount of multimedia elements, animation and others that can be provided over the web page and IBT can be highly inconsistent, and may lead to very different results.

In addition, IBT can help company to improve speed and effectiveness of education processes among personnel and to communicate well between learners. Using of IBT in distance education allows organization to maximize values of its services and material resources by flexible access (Naidu, 2006). It can be high interactive as learning content that can be simplified for delivery through the web page. Learning experience and method can be improved by systematical adding of different case studies, researches and some content from different sources outside of IBT module (Kashyap, n.d.).

## 2.8 E-learning elements

### 2.8.1 Content Design

Content of e-learning is referred to as resources and objects of learning. It is digital resource that can be reused to support learning process. E-learning content is used by learners to be learned, and for teachers to teach. Content needs to be organized clearly and it is divided into chunks. Learners need chunks to assimilate. It has to focus on gathering of the necessary skills and knowledge by learners. All exercises that are in content should be directly related to the objectives and should reinforce key messages (McIntosh, 2006).

There are three categories of e-learning content (Chyung, 2007)

1. Declarative (knowing what) → concepts and facts
2. Procedural (knowing how) → procedure and processes
3. Situated (knowing when and how) → principles

#### *Declarative knowledge (knowing what)*

Declarative knowledge is a basis for difference complex knowledge and it consists of descriptions of facts and things or methods and procedures.

#### *Procedural knowledge (knowing how)*

The “knowing how” means itself about procedures and processes. To differentiate between procedures and processes, a comparison be done together with production process that is performed based on a flow of interrelated steps (Chyung, 2007). This view of procedural knowledge includes a specific complex of task and procedure as procedural knowledge. The thing in this view is no different from declarative knowledge except when tasks are being described instead of facts (Nickols, 2010). Table 2-4 shows the structured block diagram of declarative and procedural knowledge.

|  |  |               |
|--|--|---------------|
| Facts & Things                                   |  | Motor Skills  |
| “Describing → Declarative → Procedural → “Doing” |  |               |
| Tasks & Methods                                  |  | Mental Skills |

*Table 2-4. Declarative and Procedural Knowledge (Nickols, 2010)*

#### *Situated knowledge (knowing when and how)*

Situated knowledge is knowledge that embedded in a physical site of location. Embedded knowledge is being in a particular physical location more than in a general working environment. For example, it can be laboratory that may recur in different locations (Sole & Edmondson, 2001). Situated knowledge can be shared by members of a functional group or a community of practice who are co-located, despite role or task-based differences (Dougherty, 1992).

## **2.8.2 Technical Design**

This element of E-learning includes discussions of images, text, color, sound and navigational system. All these basic parts are used to create interface with good combination that are pleasing to the eye as well as simple to use. In this case Mulet and Sano (1995) state that simplicity is the most important element of design and they are sure that to achieve simplicity of E-learning module, one must either be a genius or one must learn certain principles and techniques. But as a life shows not all people are geniuses and based on that fact the designers should follow principles that tested for years and can bring expected results. In this case, it is necessary to note the main principles that used in technical design element: unity, refinement and fitness. Unity is achieved when two or more parts of design (text with images or text with audio) are combined to produce a coherent whole. Refinement is a method of achieving simplicity and elegance by continuously eliminating the design parts that are not necessary. And fitness principle is achieved when design fits purpose, i.e. the design affords the purpose of the design.

As for technical design parts such as text, color, images and sound have a universal appeal, and they can enhance a web site to attract a great number of people. For example, text has the added value of linking it to other media in most creative ways. Because of such a wide appeal, text can be used for multimedia content, menus, buttons and navigational systems. Images often enhance web sites and add an aesthetic beauty to the site that no other media can do. The use of appropriate colors allows the personalizing of E-learning module. A basic understanding of the nature of color and how it can be used to enhance E-learning is essential. Sound is considered one of the most important parts of design. Sound can capture and focus learner's attention but also it can greatly facilitate for those learners who have difficulties with reading. Sometimes, sound is more powerful than text because it may be used for speech, music or special effects (Gillani,2003).

## **2.8.3 Learning Process**

The main task of this E-learning element is about how technology should be used in training area. Therefore this element is quite complicated to perform. Furthermore, it remains in itself a private and tacit process. Usually learning outcomes are often given as the starting point as they can be used to (Beetham & Sharpe, 2007):

- Define learners' knowledge, understanding, intellectual and subject specific skills at each level.
- Clarify the purpose of the course.
- Identify and prioritize which topics to teach, and in what depth.
- Select appropriate teaching and learning strategies.
- Specify how learners demonstrate their learning through purposeful assessment tasks.

## **2.9 E-learning Advantages and Disadvantages**

As practice shows, any organization determines the denominations and weaknesses of each asset such as system, technology or some equipment before to use it. This approach is quite important today because companies focus on goals that have to bring benefits to them through doing goods and services. Therefore, system, technology or equipment must respond to company's requirements. In this case, E-learning tool is considered as one of organization assets and it has to bring some benefits to organization such as an effective learning process and high competence level of personnel. Thus, the main following advantages and disadvantages of E-learning were found based on work of Yvette (2007).

*Advantages:*

- Flexibility, Accessibility and Convenience (all learners can access the materials in their own time and study at their own pace and place).
- Cross platform (all learners can access the content through window-based or Mac-based).
- Low delivery costs (once E-content has been developed and uploaded on the server, it is relatively inexpensive to distribute domestically and worldwide).
- Ease of update (E-learning enables the content to be easily and regularly updated and instantly available to all learners).
- Collaborative learning (E-learning promotes collaborative learning thus resulting in a more engaging and richer learning experiences).
- Scalability (content can be delivered to a small or large number of learners with little effort).

*Disadvantages:*

- No human contact
- Programs that are used for training by E-learning are too stationary
- E-learning development needs more time and money than classroom trainings
- Not all courses can be delivered by e-learning as some training topics require more personal touch and connection

## **2.10 Challenges of E-learning**

E-learning is changing in that way where enterprises gain advantage through increased human work performance. But anyway still there are challenges that block effectiveness learning process to personnel.

### **2.10.1 Characteristics of Implementation**

Learning process requires practical experience. Not all companies use own programs and questionnaires to indentify correctly the skills and lack of personnel knowledge. For example, to be trained better, e-learning training has to be performed in specially equipped rooms in the companies. Unfortunately, companies not always have an opportunity to select the learning materials and software by themselves. In this situation, programs and materials suppliers usually do not develop E-learning content aftermarket. Consequently the programs and materials may not be faced to real needs of company that wants to teach its personnel.

Sometimes, organizations usually use different approaches in selecting their personnel and employees for training programs. Large varying of background of training people may not lead to expected results. In addition, instructors and trainers who involved in training courses they play the roles of tutors or coaches. Since no specific qualifications are needed for those roles, the skills of trainers and instructors are mainly characterize by their previous work experience in training process (Reich & Scheuermann, 2002).

### **2.10.2 Problems with Introducing E-learning**

Companies should rethink about their business and learning habits to promote an implementation of E-learning as e-learning introduction that often accompanied by problems straight related to management activities and learning culture of the company. Lack of human recourses in learning area is a key problem that has to be handled. Otherwise it is very difficult to reach expected goals of organization. One of the approaches to do good E-learning introduction is a learning culture in organization. Learning culture covers the planning of learning activities on long terms and consequently employees are often forced to update their knowledge and competence by

themselves. One of the parts of learning culture is qualification understanding that connects to real needs in working situation. In this case, certificates and formal qualifications of personnel are only forms of qualification and that's way it is getting more and more important for companies to require special skills and knowledge in a short time for special purposes.

People who do decisions in company have to face requirements for new models and methods that used in training. They have to pay attention and learn the benefits of new technologies and applications (learning software, network technology, e-mail, application-sharing and others). In addition, some decision makers, human resource managers and supervisors do not get direct insight in learning progress of their personnel. Management has to change their qualification understanding, otherwise employees who engaged and interested in learning process will feel that they do not get enough support and encouragement by their managers (Ahmadpour & Mirdamadi, 2010).

### **2.10.3 Inadequate Infrastructure**

People who involved in learning training process as instructors need rethink and fundamentally restructure E-learning classes. Company that operates in industrial area doesn't always organize a suitable workplace and therefore employees often face bad conditions of E-learning on the job. This issue is quite important and employees must have an immediate access to information in order to get a high qualification that is necessary for their work.

Some companies still have a lack of adequate learning materials. This problem can be arise based on following facts: training activities among enterprises often relate to an inability to articulate and scope their learning needs; cost factor of training programs not always fit to financial possibility of all companies; it is difficult to assess the merit and value of offerings available because not all training programs cover specific needs of company that wants to train its personnel. The gaps between trainers and designers have to be avoided by identifying the knowledge and skills that needed for learners. Usually the gaps arise based on inability of educators to bridge the technical divide (Leary & Berge, 2006).

### **2.10.4 Missing Organizational Perspective**

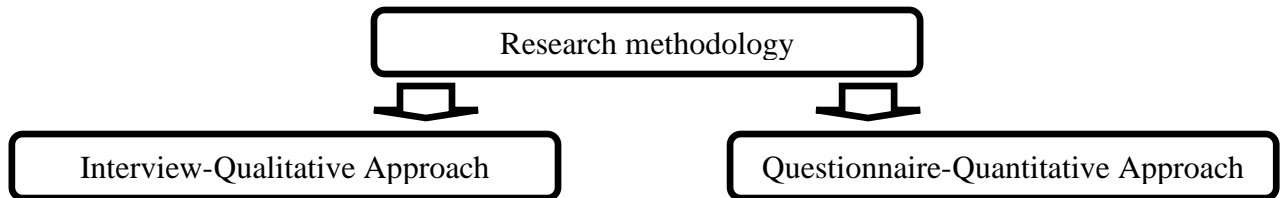
Unfortunately company that expresses its interest in E-learning training doesn't cooperate effectively with other companies. Good cooperation of one company to other may help to achieve positive results such as reducing costs and gap of know-how. Also cooperation will let companies be able to share information and know-how, and lead to collaborative forms of learning process. Training and education programs in organization have to be aimed to identify and develop the potentials of employees because successfulness of company depends on human factor. In this case, strategic implementation of E-learning training method has to be developed in such directions as the learning-off-the-job offerings, i.e. learning on the job, learning near the job, learning at home and others.

Sometime based on scale of company is unable to provide training itself for new employees and further continuously training for its own personnel. For example, a company addresses to external competent education enterprises that can provide a training program. In this situation may be such problems as dominance of daily business and unsatisfactory information about the environment of company. The reasons of appearing those problems might be co-operation of management on the technical – operative level, a low degree formality and organization and lack of hierarchies (Reich, et. al., 2002).

### 3.0 METHODOLOGY

#### 3.1 Research Methodology Analysis

The qualitative and quantitative approaches were used in this research (figure 3-1). A qualitative approach was performed through interview part. It was necessary to know how people understand the importance and meaning of module using of E-learning tool for training process of organization. A quantitative approach was done based on questionnaire part. This approach gives an opportunity to identify numerical differences between personnel opinions.



*Figure 3-1. Research Approaches*

##### 3.1.1 Interview - Qualitative Approach

The interview participants were strategically selected. Managers who work in training process of Skretting personnel were invited to take a part in the interview. The interview location varied to the need for privacy. In all cases, management wanted to be interviewed in its offices. The process of the interview started with an appointment arrangement. Interview questions and the main purpose of it were sent through e-mail to conduct the interview. Number of managers was three persons from three different departments of Skretting (human recourse, feed production and process). The same questions and facilitation guides were used for interviews. Their answers were typed and confirmed by them after interview.

##### 3.1.2 Questionnaire - Quantitative Approach

At the last cycle of the research, process engineers and operators from different countries (Norway, Canada, Chile, France, Japan and Australia) were asked to take a part in the questionnaire. Number of personnel who work in production sector of Skretting was twelve people, two employees from each country. Questionnaire consists of 27 questions that divided in several sections such as preliminary information, information about PC and English skills of personnel and also technical design, content design and learning process of E-learning module. Number of participants was established by Skretting management and all they were informed through e-mail before to send the questionnaire. One work week was given to personnel to work through the whole module of E-learning tool and fill up the questionnaire. Ten responds were received from personnel instead of twelve possible. Therefore, in analysis part of the research each employee was taken as 10%.



## 4.0 RESULTS and ANALYSIS

### 4.1 Existing E-learning Tool in Skretting

Skretting has created an internet-based training (IBT) module in conditioning area of fish feed production through E-learning tool (Articulate Presenter '09) with purpose to train its personnel who involved in production plants, in the world scale. This tool offers a wide range of affordable solutions for organization and corporation. The power of E-learning tool is in its ease-of-use, as well as its robust features and flexibility but also it makes easy for anyone to add interactivity and narration to PowerPoint slides. The language of E-learning tool is english. At the end of the module, the quiz question is used to assess the knowledge level of learner. To use and to be trained through this E-learning tool, it is needed a network connection and computer device. The benefits and features of this type of E-learning tool presented in following subchapters.

#### 4.1.1 Benefits

1. Animated annotations that highlight important points
2. Clear, crisp images and video
3. Multi-level navigation and branching
4. Embedded live web pages and other objects
5. Multiple publishing options, including Flash, Word, CD and podcasts

#### 4.1.2 Features

*Flash authoring in PowerPoint.* Transform PowerPoint into a fast and easy Flash-authoring tool. Presenter '09 lets a designer rapidly create Flash-based presentations and E-learning courses with a tool that is already known — PowerPoint (figure 4-1).

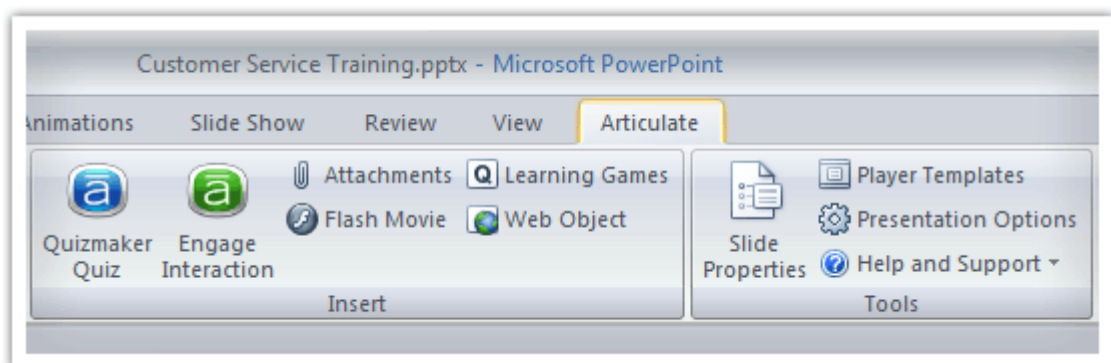


Figure 4-1. Flash Authoring in PowerPoint

*Record and sync narration.* Quickly synchronize the presenter's voice with slides and animations for a rich learning experience. Presenter '09 puts everything a learner needs in one exclusive, consolidated workflow.

*One-click publishing to multiple formats.* Easily create SCORM (Sharable Content Object Reference Model) or AICC (Aviation Industry CBT Commission – one of the international standards of book material exchange) compliant content for learner LMS (Learning Management System). Publish for the Web, CD, and Word and even create an audio podcast — all with a single click.

*Customizable, feature-rich Player.* Put all learners in control with a unique player, which lets viewers easily navigate the content and access additional resources. Customize a project with a

logo, layout, navigation options, color schemes, and language to provide a unique branded experience (figure 4-2).

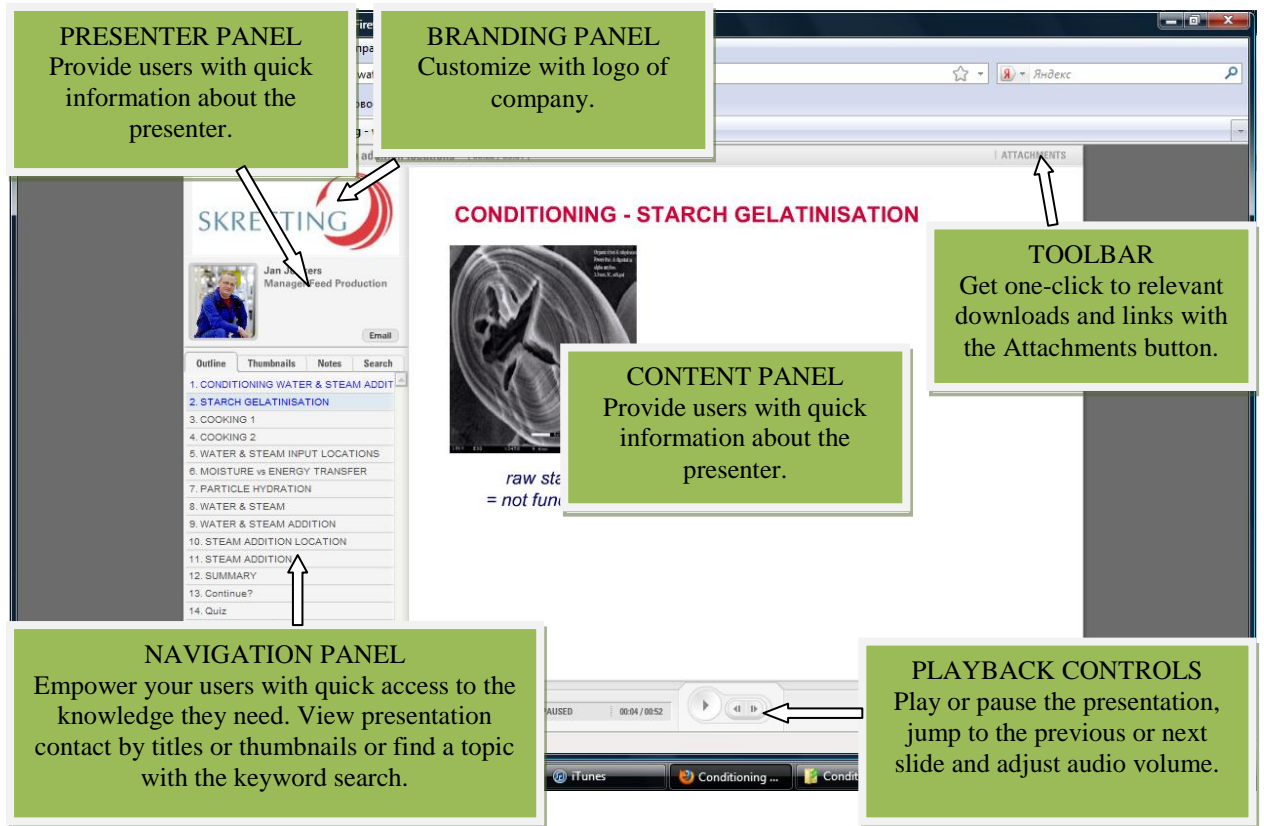


Figure 4-2. Customizable of E-learning Module

*Multi-lingual support.* Reach a wide audience by customizing a content for nearly any language. Select from one of the 11 built-in languages (French, Japanese, Spanish, English, Chinese, Italian and others), or enter learner own with the customizable multi-lingual support (figure 4-3).

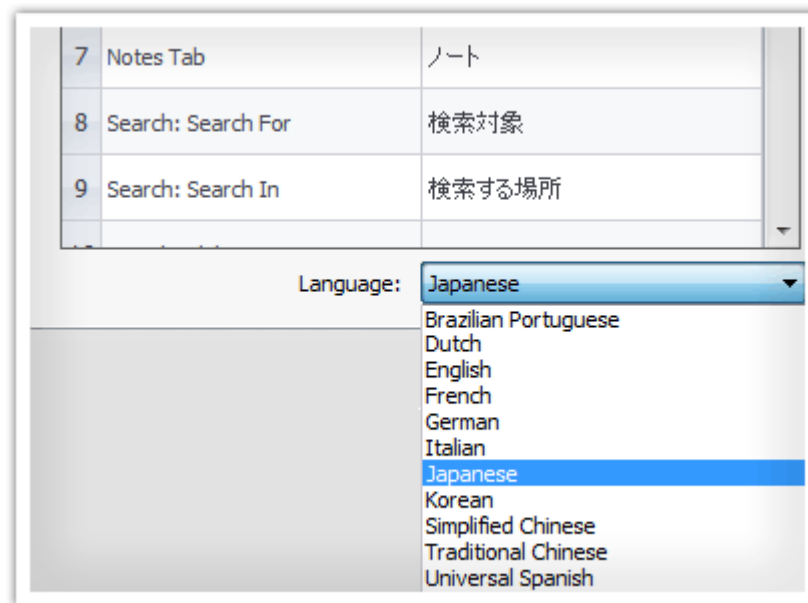


Figure 4-3. Language Support of E-learning Tool

*Add multimedia and interactivity.* Seamlessly incorporate engage interactions and Quiz maker quizzes, video, Flash, and more.

*Sophisticated branching.* Send learners to different slides depending on their choices.

*Add professional annotations.* Easily add polish to presentations with professionally-designed annotation shapes and spotlight effects. Choose the perfect size, animation type, color, and more.

*Single-slide preview.* Publish just one or a few slides at a time.

*Multi-level navigation.* It is possible to arrange all slides into sections and topics.

*Manage projects easily.* Presenter '09 safely stores all production files in a single.

*Use the latest PowerPoint features.* Presenter 09 works great with PowerPoint 2000 and later. And PowerPoint 2007 users will be able to take advantage of PowerPoint 2007's coolest new feature, SmartArt.

## 4.2 Interview Analysis

The interview has six questions and each three of them focus on training issue and existing E-learning tool in organization. It was very important to know about personal opinions of Skretting management. Importance of knowing their opinions was to find the ways that could help organization to develop and increase the effectiveness use of E-learning module.

### 4.2.1 Today's Training Technique of Skretting

Knowledge and skills of the personnel are important aspects for Skretting. To provide specialized knowledge and skills of the personnel Skretting managements organizes different training programs. Some of these programs are courses and conferences that are held annually. For example, one of the courses was performed in 2011 in Canada (table 4-1). Usually, all courses are conducted in organization with participation of one or two instructors and through classrooms. Duration of course is from 2 to 5 days where all personnel intensively study the materials about fish feed production.

| <i>Training in 2011 - Feed production</i> |               |                                |
|---|---------------|--------------------------------|
| <b>Date</b>                               | <b>Time</b>   | <b>Course Content</b>          |
| April/Day 1                               | 08:45 - 09:15 | Introduction                   |
|   | 09:15 - 09:45 | Raw material functionality     |
|   | 09:45 - 10:30 | Quiz and discussion            |
|   | 10:45 - 11.15 | Grinding                       |
|   | 11:15 - 12:00 | Quiz and discussion            |
|   | 13:00 - 13:30 | Conditioning                   |
|   | 13:30 - 14:15 | Quiz and discussion            |
|   | 14:15 - 14:45 | Extrusion, die design          |
|   | 14:45 - 15:30 | Quiz and discussion            |
|   | 15:45 - 16:15 | Extrusion bulk density control |
|   | 16:15 - 17:00 | Quiz/discussion                |

*Table 4-1. Today's Training Program in Skretting*

#### 4.2.2 Competence and Training Issues for Skretting

The one of the reasons to conduct the interview was to know about competence and training issues for Skretting and based on this reason the following questions were asked in the interview:

1. *How do you train/teach operators at present?*
2. *Why training of operators in production area is important for Skretting?*
3. *What is the competence strategy/plan in Skretting?*

Personnel training process of Skretting is conducted by inviting external organizations that operate in feed production area and equipment suppliers. Representative persons of these external enterprises take a part in training course and teach the personnel of Skretting. Supply companies explain to personnel how use equipments in effective ways. In the interview managers of process and human resource departments stated that the main point of training is to share the knowledge, ideas and special experience. But however it is needed to note that existing method of training doesn't have capability to cover all personnel of Skretting who work in fish feed production by one course or conference that aimed to train them. Furthermore, this method can't provide a continuous increasing knowledge of personnel because of time limitation issue of the course as it was presented in table 4-1. Otherwise it is needed to organize the courses and conferences all the time but this training approach is not effective for organization because it requires additional costs and human resource for regular travel around the world.

As one of the global production companies Skretting utilizes different equipment and processes at production plants. Technology that used in organization is subjected to be improved based on new requirements of customers and market, and its development leads to changes of control algorithm and technological parameters. In this case the level of knowledge that is needed to operate improved technology of production plant is getting more complicated. Consequently, this level of knowledge must be learned by personnel. This relationship between technology and personnel in production area is quite clear understood by Skretting management. Therefore, managers are convinced that training program is one of the crucial aspects for organization. In addition, managers believe that training program, i.e. courses and conferences can increase production effectiveness, may keep standards and keep correct process technology, and can decrease of raw materials losses.

Further, human resource manager of Skretting has paid attention more on the competence of organization than others. She has added that organization competence is divided into three components: *knowledge; skills; abilities and attitudes*. Based on her statements these competence are understood follows:

1. Knowledge means about expertise and basic theory, i.e. personnel must understand the tasks and know how to perform them.
2. Skills are applied for expertise, techniques and methods that needed to solve the tasks.
3. Abilities and attitudes mean about behavior, relationships and willingness that is necessary to provide the tasks in the best way.

#### 4.2.3 E-learning Perspective of Skretting

In this subchapter the management opinions about E-learning tool will be discussed. The following questions were used in the interview:

1. *Do you think that E-learning tool could improve the existing learning methods for operators?*
2. *What result can Skretting achieve in production sector by implementing e-learning?*

3. *Which possible advantages could be reached by using e-learning and what advantages are most important for Skretting?*

Received answers have shown that E-learning tool is quite important for organization to train personnel. The reason is that E-learning tool could provide factors such as flexibility, accessibility, reusability and durability to learning process of personnel.

According to opinions of feed production and process managers a flexibility factor can be achieved by decreasing of training time and personnel can go back to a topic or module of E-learning tool anytime, in case if they have lack of knowledge. These two issues are possible to implement because E-learning tool is used through online mode (Liebowitz & Frank, 2011). Accessibility factor can be reached through personnel computer using. Any computer device only needs a network connection and it is not matter about their locations and time before to use E-learning tool (Anastasiu, 2008). In addition, managers have noted that E-learning tool could let to identify the knowledge level of each process engineer and operator. Personnel knowledge identification may fill up their knowledge gaps.

Since E-learning tool keeps all necessary materials in itself as long as they are useful for personnel, reusability and durability factors might be provided. New materials and topic can be added in E-learning tool over time. Thus, personnel and new employees will have an opportunity to be educated in a widely dispersed way.

All managers see several goals for Skretting that could be achieved with implementing E-learning tool in organization. For instance, all of them think that E-learning tool could bring to organization priceless values such as better quality of the end products, less complaint from customers of Skretting, better standardization of production cycle and higher competence of personnel and organization. Skretting management has expressed its opinions regarding following main advantages for organization that might be being in case of using E-learning tool: improving the productivity, product quality and other performance factors; building and delivering information knowledge faster and easier in production area.

### **4.3. Questionnaire Analysis**

#### **4.3.1 Competence Level of Personnel**

Since a language of E-learning module is english and E-learning tool needs a computer device and network, it was important to identify the competence level of personnel, i.e. their PC and english language skills. Consequently, the following questions related to competence level of Skretting production were written:

1. *How normally personnel have access e-mail and/or the Internet?*
2. *How normally personnel use a computer?*
3. *How many years the personnel have been using a computer?*
4. *How many hours personnel spend a week at home or elsewhere on the Internet?*
5. *English language level of personnel?*

#### *Personnel e-mail or internet access and computer use*

The obtained results of the first and second questions have shown that process engineers and operators use e-mail/internet and a computer device very often (figure 4-4). Two columns in the figure show 90% and 100% of the personnel that they use e-mail/internet and a computer device every day, respectively. According to these results I can suppose that the most personnel who work in production area use e-mail/internet and a compute intensively. Thus, I can assume that

all production personnel have good PC skills and won't have any troubles with using of E-learning tool.

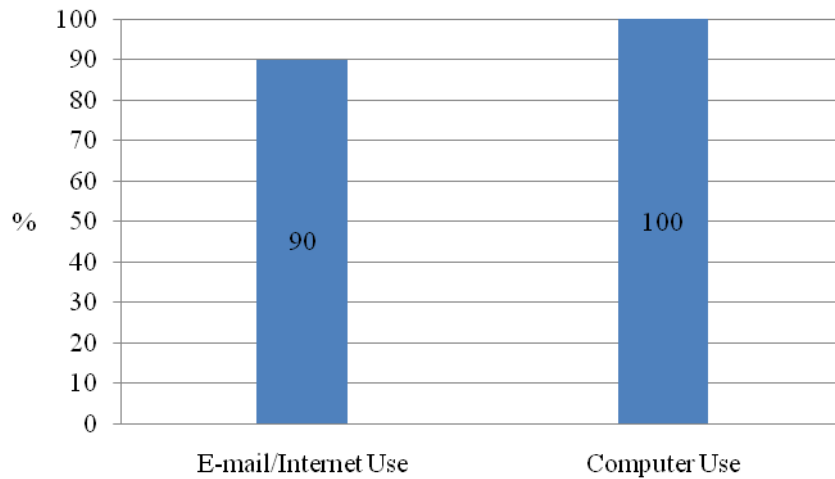


Figure 4-4. Internet/E-Mail and Computer Use

*Personnel experience in compute use*

The third question is about how long the personnel use a computer device. The received data have shown high results where each employee has a long experience of computer use. Based on personnel minimum experience and high intensiveness of computer use, it needs to be assumed that personnel computer skills are very high. Consequently, each person holds good PC skills that give an ability to use E-learning module without any difficulties. In addition the average time of computer use was identified too. All results illustrated in table 4-2.

| <i>Nº</i> | <i>Country</i> | <i>Position</i>  | <i>Time period of computer use, years</i> | <i>Average number of computer use, years</i> |
|-----------|----------------|------------------|---|--|
| 1         | Chile          | Operator         | 16  | 15.2   |
| 2         | Chile          | Process engineer | 15  |  |
| 3         | Japan          | Operator         | 8   |  |
| 4         | France         | Process engineer | 10  |  |
| 5         | Norway         | Process engineer | 25  |  |
| 6         | Norway         | Operator         | 15  |  |
| 7         | Australia      | Process engineer | 3   |  |
| 8         | Australia      | Operator         | 20  |  |
| 9         | Canada         | Process engineer | 25  |  |
| 10        | Canada         | Operator         | 15  |  |

Table 4-2. Time Period of Computer Use

*Personnel used time on internet*

The next question was focused on personnel using time for internet purpose. Personnel responds have given more qualitative results. These results illustrate that personnel spend time on internet differently but anyhow an average number of internet use was found. The received data have shown that operators spend more time ( $\geq 30\%$ ) on internet than process engineers. The reasons of this difference might be several. Results illustrated in table 4-3.

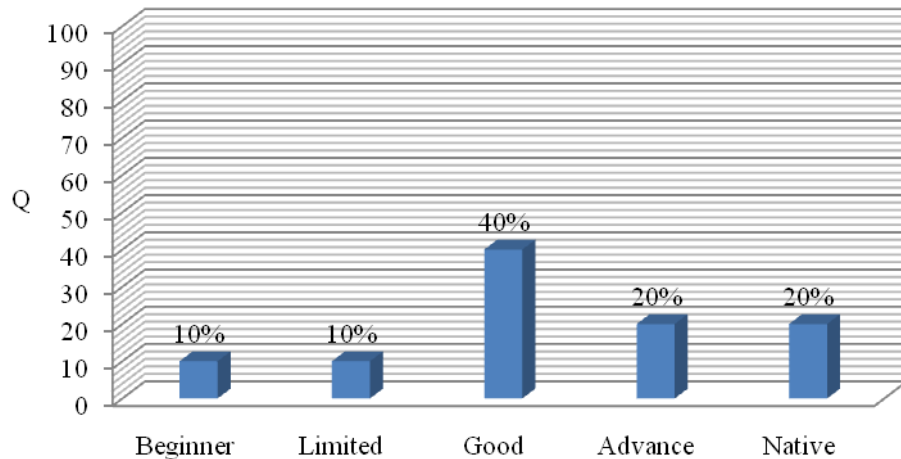
| <i>Nº</i> | <i>Position</i>  | <i>Work in current position since</i> | <i>Total hours a week</i> | <i>Country</i> | <i>Average number in hours</i> |
|-----------|------------------|---------------------------------------|---------------------------|----------------|--------------------------------|
| 1         | Operator         | 2008                                  | 11                        | Chile          | 9,6                            |
| 2         | Operator         | 1999                                  | 21                        | Canada         |                                |
| 3         | Operator         | 1986                                  | 2                         | Australia      |                                |
| 4         | Operator         | 2010                                  | -                         | Norway         |                                |
| 5         | Operator         | 2001                                  | 14                        | Japan          |                                |
| 6         | Process Engineer | 2003                                  | 5                         | Chile          | 6,4                            |
| 7         | Process Engineer | 2011                                  | 2                         | Canada         |                                |
| 8         | Process Engineer | 2009                                  | 10                        | Australia      |                                |
| 9         | Process Engineer | 2001                                  | 12                        | Norway         |                                |
| 10        | Process Engineer | 2009                                  | 3                         | France         |                                |

*Table 4-3. Personnel Hours Used*

*Personnel english level*

And the last question was written to identify personnel english skills. The reasons of using this question are following: language of E-learning module is english; personnel who took a part in the questionnaire are considered as multinational people. In other words, one way of good personnel understanding of E-learning module content is english skills of employees. The level of personnel english skills was distributed in five different categories: beginner, limited, good, advance and native.

All personnel have expressed different level of english skills. The results have shown that the most personnel have english skills as “good” and lower, these results refer employees from Norway, Chile, France and Japan. The rest of the personnel have english skills as “native” and “advance” that refer to Canadian and Australian employees. In addition, personnel from Norway, France, Chile and Japan have remarked that they would like to use their native language to be trained through E-learning module. Distribution of personnel english skills illustrated in figure 4-5.



*Figure 4-5. English Language Skills of Operators and Process Engineers*

**4.3.2 Technical Design of E-learning**

According to one of management points the effective knowledge transformation to personnel is one of important issues for Skretting. Furthermore, Putzhuber (2003) states that good knowledge of personnel increases the professional competence of an organization and it enhance the competitiveness of the organization in relative to others in a market. Based on this, the next part

of questionnaire considers the technical design of E-learning module through the following questions such as:

1. *How fast the e-learning web page opens?*
2. *How easy it is to navigate inside the module?*
3. *What is the quality of the text and images?*
4. *What is the quality of the sound in the module?*

All these four questions focus on technical characteristics of E-learning module, namely speed, navigation, visualization and sound. Assessment of each characteristic illustrated in figure 4-6.

*Speed*

Responding of module web page performed with good quality. Personnel how worked through E-learning module have given the following assessment: 30% - very fast, 30% - fast, 30% - in between and 10% - very slow. One person who gave an evaluation as “very slow” has noted that network connection couldn’t provide a high speed and it negatively affected on module web page responding in the whole. In addition, I can suggest the same reason of 30% “in between” value.

*Navigation*

This type of technical characteristic designed really good. All personnel gave evaluation as 30% - very and 70% - easy.

*Visualization*

Visualization characteristic has a good quality. The most personnel made assessment as “very good” and “good”. The rest 10% of personnel evaluated as “in between”.

*Sound*

Sound characteristic performed a little bit worse in comparison with other types. Assessment of personnel distributed in four categories: 20% - very good, 60% - good, 10% - in between and 10% - bad. Based on my personal opinion, assessment as “bad” and “in between” was made due to excess noises in instructor speech.

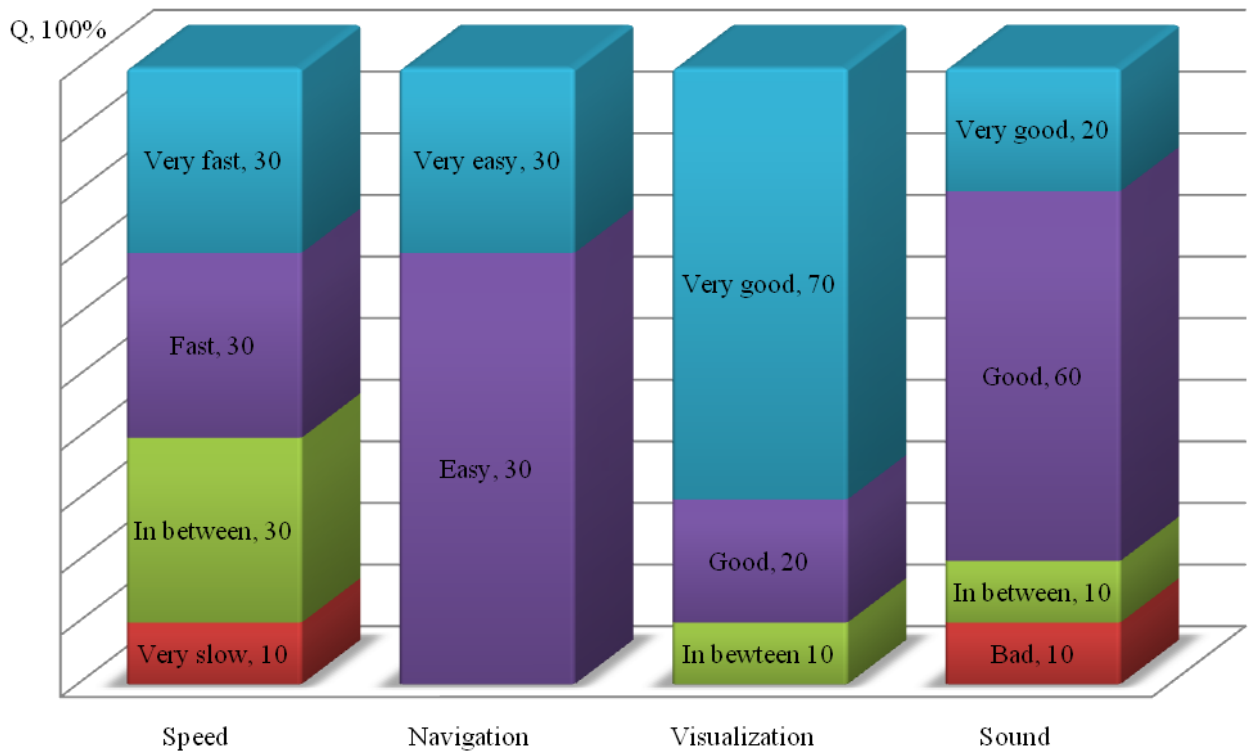


Figure 4-6. Technical Design Characteristics



Thus, after all personnel assessments regarding four characteristics, it is needed to note that they performed with good quality. However, sound characteristic should be improved, it is necessary to remove the excess noises.

### 4.3.3 Content Design of E-learning

This element of E-learning module is consisted from several objects and that's way it was important to identify the qualitative performance of them. The objects of this element are E-learning instructor, learning content types, material explanation and clearness of quiz questions. Thus, the following questions were written:

1. *How easy it is to understand the E-learning instructor?*
2. *What content type is useful for learning?*
3. *How clear the content of the E-learning module is explained?*
4. *How clear the quiz questions are asked?*

#### *Personnel understanding of E-learning module instructor.*

Opinions of personnel regarding the first question of content design part were distributed into three categories: 40% - in between, 50% - easy and 10% - very easy (figure 4-7). Since a module of E-learning tool was performed with using english language, personnel understanding depends on their level of english skills. In addition, E-learning instructor is not a native english speaker. These two facts significantly affect on the level of instructor understanding. An attention should be focused on word understanding by personnel, not a content understanding of E-learning module. Consequently, it can assumed that personnel can understand a content. In this case, a content might be quite useful for learning if personnel have good english skills.

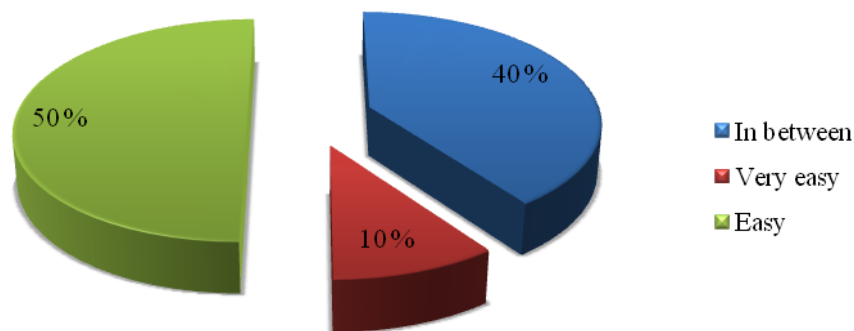


Figure 4-7. Understanding Level of E-learning Instructor

#### *Usefulness of content types for learning process*

Paulsen (2003) states that learning process can be effective if content types are used in online training through E-learning module. In this question, six different content types presented in the questionnaire and each of them has a crucial advantage for personnel training. All personnel have expressed their desire to be trained by using video, graphics and animation the most. But anyhow all six presented types were selected by personnel as necessary parts that need to be in E-learning modules (figure 4-8). According to my point of view, all these types need to be used in module because each of them carries some different information. For example, text may give more information than graphics but graphics can explain content in more details than images. Furthermore, mix using of types might give more effectiveness in learning process instead of using only some of them for each topic.

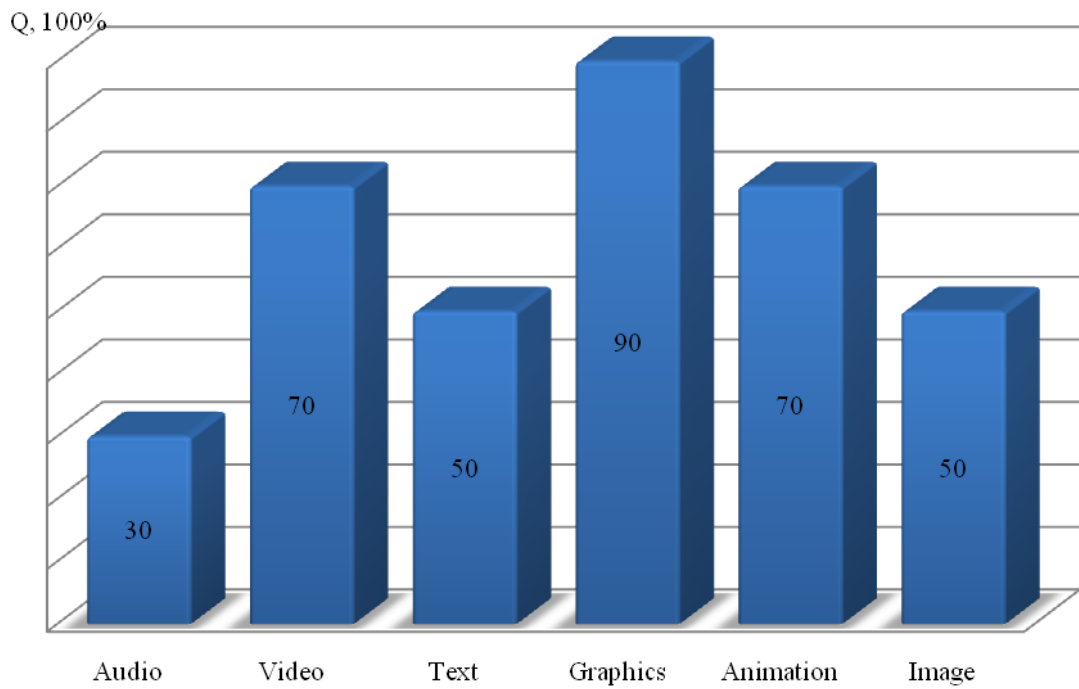


Figure 4-8. Usefulness of E-learning Content Types

#### Clearness explanation of E-learning module

Personnel opinions regarding this question were divided into three different views such as 40% - very clear, 50% - clear and 10% - slightly clear (figure 4-9). These results illustrate that this object performed very well. Even different personnel english skills were not an obstacle for them to understand the content and find its relation to production sector. It can be assumed that personnel assessment of clearness explanation issue was made based on their professional knowledge, work responsibilities and experience.

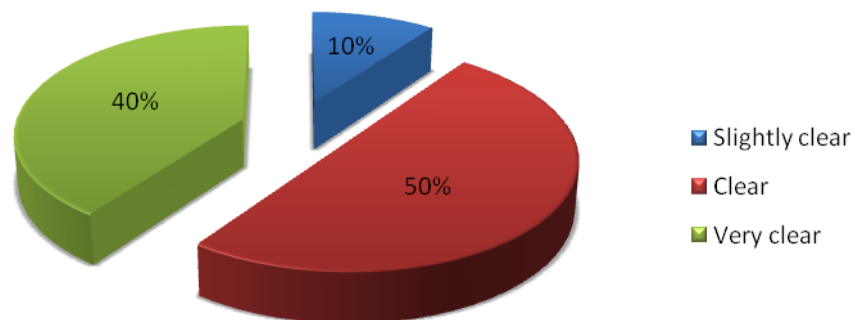


Figure 4-9. Quality of Content Explanation

#### Clearness of quiz questions

This object is considered as one of important part of E-learning module. The reason is that quiz makes an assessment about knowledge of personnel after their module training. And that's way quiz questions should be clear performed. The obtained results have shown that personnel could identify all quiz questions as clear and very clear where 30% and 70% respectively (figure 4-10). Thus this object of content design E-learning module performed very well.

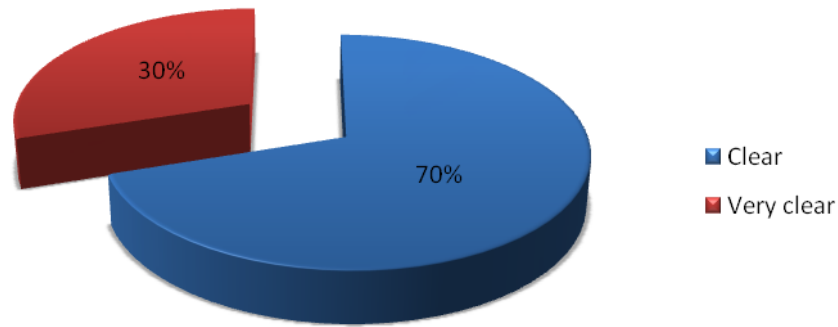


Figure 4-10. Clearness of Quiz Questions

#### 4.3.4 Learning Process of E-learning

The last part of E-learning module was focused the most on usefulness issues. The following questions were written in this field:

1. *How easy it is to understand the content of the module?*
2. *How useful is the content of the e-learning module?*
3. *How useful is the e-learning module for new operators?*
4. *It is useful to study other modules through e-learning tool?*

##### *Personnel content understanding*

The answers to the first question were distributed into three categories: difficult, easy and very easy. The most personnel have understood the content of the module in “easy” way. The rest of the personnel have identified their level understanding like “difficult” and “very easy”. The data of these categories were distributed as follows: 60% - easy, 10% - difficult and 30% - very easy (figure 4-11). According to obtained numbers it is needed to note that personnel must understand the content of the module on high level as much as possible. Because it is known that knowledge used and work performance in organization depends on level of material understanding by personnel (Liebowitz & Frank, 2011).

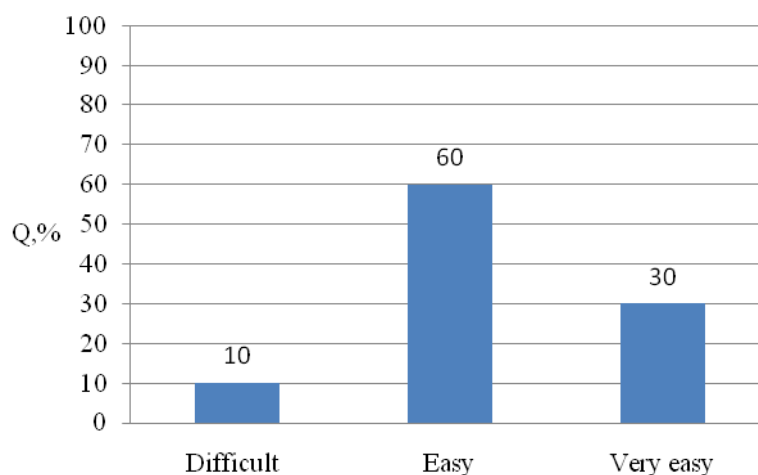


Figure 4-11. Personnel Understanding of E-learning Module Content

##### *Module usefulness for training and for new personnel (operators and process engineers)*

Based on second and third questions, the personnel have done an assessment of usefulness issue of E-learning module content. Their opinions were categorized into three categories, mostly: slightly useful, useful and very useful. The most personnel think that module content can be very

useful for training. Usefulness of the module for new personnel, i.e. for new operators and process engineers might be useful either. Their answers based on these two questions distributed as follows:

- Usefulness of module content (figure 4-12): 10% - slightly useful, 20% - useful and 70% - very useful
- Usefulness for new personnel (figure 4-13): 10% - slightly useful, 30% - useful and 60% - very useful.

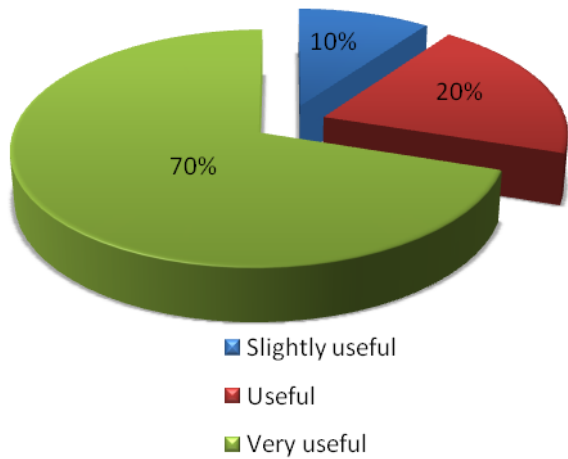


Figure 4-12. Usefulness of Module Content

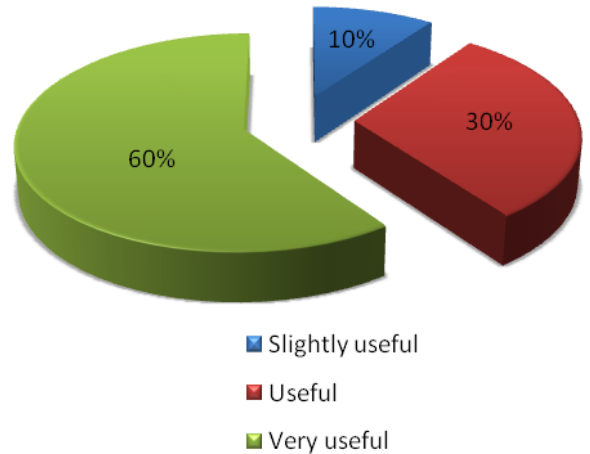


Figure 4-13. Usefulness for New Personnel

*Usefulness of E-learning tool to study other modules in further*

The last question summarises about learning process element of E-learning tool. In this part of the research I were interested in how the personnel think of studying the other modules through existing E-learning tool.

The results that obtained were important to Skretting management because existing E-learning tool is a test version and it needs to be improved not only according to management views but also based on personal opinions of the employees. Opinions of the personnel were very positive and they all have expressed a desire to study the other modules through this E-learning tool (figure 4-14, 4-15).

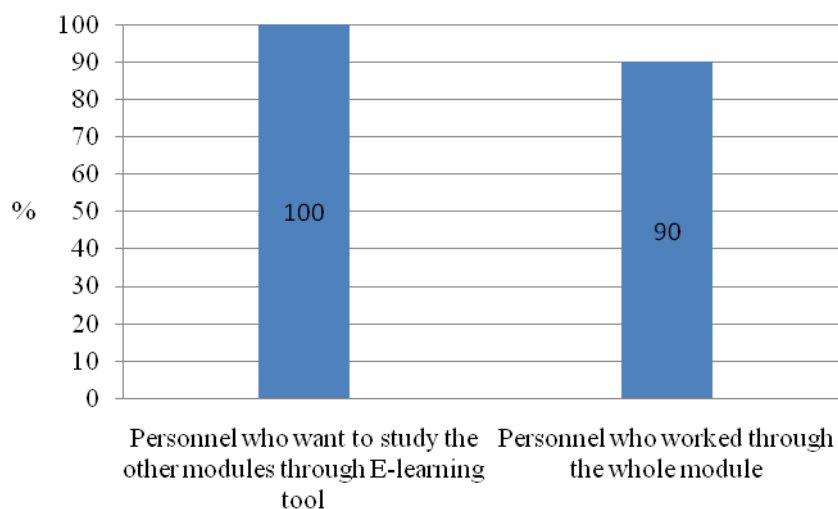
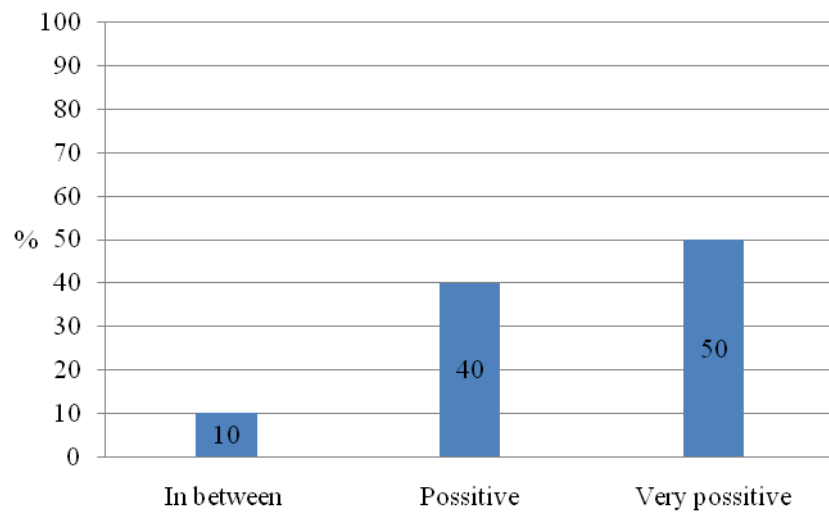


Figure 4-14. Level of Study Willingness and Module Working



*Figure 4-15. Overall Evaluation of the E-learning Training Concept in Skretting*

## **5. DISCUSSION**

### **5.1 Interview Part**

Based on the results of the management interview, especially according to the statements of all managers the following opinions can be marked:

- Skretting management finds out that E-learning might be significantly useful for organization in personnel training field, especially for a worldwide and multinational company.
- All interviewed managers have noted that training issue has a crucial value in Skretting.
- Managers think that existing training strategy needs to be changed fundamentally because it doesn't face today's requirements of organization.
- Managers of human resource and feed production departments are sure that E-learning tool could solve problems such as limitation number of training personnel and limitation of time learning.
- Skretting management has a point of view that E-learning tool may bring the main benefits to organization such as better quality of end products, less customer complaints, higher personnel competence, more effective work performance of supervisor, main operators and shift managers, and less number of failures in fish feed production.
- Managers are convinced that E-learning tool will allow Skretting management to identify, significantly easier, the knowledge gaps of each employee.

### **5.2 Questionnaire Part**

#### **5.2.1 Competence Level of Personnel**

English and PC skills of personnel were identified in details. Obtained data have shown quite satisfaction results. Almost all personnel have access to network and use e-mail quite often. They have enough experience in using computer devices. Almost all personal can read, listen and talk with using of english language between each other if it is necessary. Some complexities appear when personnel face technical and professional english language. Thus, it can be noted that they won't have a problem with using of E-learning tool but english skills of personnel then it needs to be improved or another alternative solution should be found. In addition, E-learning tool does not require special PC skills from personnel.

#### **5.2.2 Technical Design**

In this element of E-learning module an attention was focused on technical characteristics, namely speed, navigation, visualization and sound. The results have shown that they were performed with quite good quality, especially navigation and visualization characteristics. As for the rest of characteristics, speed and sound, they need to be improved.

#### **5.2.3 Content Design**

The first question was focused on personnel understanding level of E-learning instructor. The opinions of personnel were distributed into several categories: "in between", "very easy" and "easy". The most personnel did assessment their level understanding as "in between" and "easy". Based on these results I can assume that personnel assessment of instructor understanding was made due to their english skills. Only 40% of personnel are native speakers or have advance level of english skills.

The second question was written to know about content types. The reason of writing this question is the content types are very important tools to explain effectively the content of the module for personnel. Data have shown that they would like to use all presented content types in the questionnaire, especially advanced animation, video and graphics.

The next question was needed to know about content explanation quality based on personnel opinions. Based on assessment of personnel, the quality of content explanation was identified as clear. In this case, I think that english skills do not play a crucial role in quality identification. I guess this assessment was made based on their work experience and professional knowledge. In other words, they evaluated in a way how good materials of the module are related to production sector.

Finally, the last question was focused on clearness of quiz questions. Despite the fact that all personnel have different english skills they could understand the meaning of each quiz question. Based on the results, I can argue that quiz test performed very well. Also, it is needed to say that content of the module and quiz questions are related very clear. In other words, personnel will be able to answer correctly quiz questions if they study through whole module.

#### **5.2.4 Learning Process**

The research data of this element have shown very positive results. Personnel could understand E-learning module content with no some difficulties. Even it was not hard for personnel who have “beginner” and “limited” english language skills. According to personnel opinions the issues of learning process such as usefulness of the content module for further training and usefulness for new operators are very high. Hence, learning process element of E-learning module performed with high quality.

## 6.0 RECOMMENDATIONS

Based on results of the research and discussion part of this thesis the following recommendations may be offered for each element of E-learning module:

### *Competence Level of Personnel*

1. It is not necessary to train personnel to increase their PC skills.
2. English skills of personnel need to be improved, especially for personnel who are not from native English speaking countries in case of using of English language in E-learning module.
3. Introduction of E-learning might be on English language (short explanation about using of E-learning module).

### *Technical design*

1. E-learning module needs a good network speed to be used with high web page responding. Low speed may decrease a learning effectiveness, motivation among personnel. Consequently Skretting has to provide a good network connection to each computer device.
2. Sound characteristic should have more reserve to be louder and its quality needs to be improved. The excess noises of the sound need to be removed.
3. Instructor of the module is an important part of E-learning and that's way an instructor should be a native speaker of each used language in a module.

### *Content design*

1. E-learning instructor is understood by 60% of personnel as "easy". Based on this result, E-learning module has to have a multi language mode where each learner may choose a language that he/she prefers before to start to be trained (for example, Japanese, Spanish, France and Norwegian). Multi language mode may avoid misunderstanding of material/content of E-learning module.
2. The advanced animation, video and graphics should be added in all modules of E-learning tool as one of the explanation means. These content types might give an opportunity to personnel to understand of materials in more details. Consequently, personnel could have clearer representation and understanding about fish feed production.
3. Quiz question should be used in other modules of E-learning tool. It gives an opportunity to make a correct assessment of personnel knowledge and identify their knowledge gaps.

### *Learning process*

1. Learning type of personnel, i.e. E-learning tool has to be used in organization as a method to train Skretting personnel.
2. E-learning tool should be used as personnel training facility for new operators who don't have a clear representation and understanding about fish feed production.
3. Next other topics and modules should be presented through E-learning tool.



## 7.0 CONCLUSION

The main aspect of this thesis laid on improving of existing E-learning module in organization through literature review and data collection. Interview and questionnaire of management and personnel were performed as a case study of this thesis. During the performance of the thesis the main challenges were met, such as:

- Drawing the right interview and questionnaire questions
- Performance of the analytical part of the thesis

Based on the results of the research the following conclusions can be presented:

1. E-learning module performed quite well and it doesn't need fundamental or significant changes.
2. Skretting management clear understands that modules of E-learning tool could increase learning process and significantly help to increase personnel competence and organization in the whole.
3. Materials of E-learning module presented very clear, interconnected and structured.
4. All personnel who took a part in the questionnaire see a usefulness of E-learning module and want to be trained with using other modules of E-learning tool in further.
5. Since Skretting is a worldwide and multinational company, E-learning module could reach each employee and build one work team in organization through one learning process.
6. The research of E-learning modules requires much time from a person and it needs some corrections and assessment all the time to be effective. Based on these issues there is advisable to appoint a responsible person in organization who will work with E-learning modules
7. The results of this research might be used to design and perform other E-learning modules. In further researches a company should use this data to compare with new data to identify a progress of E-learning module improvement.
8. Through this research the following advantages and disadvantages of E-learning module were identified:

### *Advantage:*

- Technical design characteristics performed quite well, especially navigation and visualization.
- High quality of the module content explanation and clearness of quiz questions.
- Easy to use.
- Good color design.
- A learner can take a contact to responsible topic person through E-learning module.

### *Disadvantages:*

- It does not have a multi language design
- Lack of content types. Animation and video are not used in the module.
- Instructor can be understood by personnel only if they have good english skills.
- Good web page compatibility depends on network speed.

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## **APPENDIX A**

### **Skretting Management Interview**

## Preliminary Information

Name: Jan Jonkers

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Position in company: R&D manager feed production

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Job specification: research activity

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Working in current position since: 2008

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Work experience (years): 7,5 years in Skretting

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Name of the organization/department: Feed production

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Date: 25.02.2011

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Place: Stavanger, Skretting ARC

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Tel: + 47 5182 5528

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E-mail: [jan.jonkers@skretting.com](mailto:jan.jonkers@skretting.com)

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### Note:

Can we mention your name in the report? Yes

## Interview 1

### ***1. What is the competence strategy/plan in Skretting?***

Up to a few years ago, Skretting organized once a year a conference in Stavanger that lasts 3 days to one week. The participants of this conference are production managers, shift supervisors and operators, researchers and equipment/technology suppliers. During this week participants exchange between each other knowledge and information, experience and ideas. This event covers only a few selected groups of people.

### ***2. Why training of operators in production area is important for Skretting?***

The reasons of training importance for operators are:

- The production will be more efficient
- To keep standards that are required by our customers and the correct process technology
- To avoid losses of raw materials during process that are needed to produce our products, in our production sector any losses lead the way to additional costs and time that influence factory performance
- 

### ***3. How do you train/teach operators at present?***

The training program is held in the following directions:

- All operators train themselves during their work
- Plant management staff is trained by annual week conferences where participants discuss the main tasks of process, challenges of technology and so on, researchers from Skretting ARC take part in training process where they tell about existing process troubles and possible technical solutions of them. Skretting ARC stopped a few years ago to organise these conferences.
- The local Skretting operating companies sometimes hire other companies that have some relation to feed production and fish industry, representatives of those companies teach the general issues of production cycle, not in deep details (this kind of training program is useful for those personnel who just start to work in Skretting and who do not yet have much experience in the fish feed production technology)
- Equipment suppliers do offer training programs for personnel of Skretting, the main focus of this training is on equipment operation, they teach how the equipment should be operated by personnel to achieve the general expected outputs/parameters but not in detail how process/technology must be performed at a fish feed production plant

### ***4. Do you think that e-learning tool could improve the existing learning methods for the operators? Why?***

I do think that with implementing e-learning training tool in Skretting we could improve our existing training program. The reasons why today's learning program can be improved are:

- An e-learning tool can reach more people in the production area around all Skrettings' production plants
- Materials about all stages of production cycle can be presented in more details for the personnel
- It will further decrease the downtime at production plants because a part of the stoppages can be caused by lack knowledge of process personnel and be more useful for new personnel that does not know about all the production and process details.
- E-learning can significantly decrease the training time period
- Managers, shift supervisor and operators will spend less time to teach and train personnel

**5. What result can Skretting achieve in the production area by implementing e-learning?**

By implementing and subsequent using an e-learning tool in Skretting we will be able to achieve results such as less downtime during production, better quality of end products, less 'out of specifications' product that has to be reproduced to acceptable expected product standards (rework), increased motivation among personnel through a better understanding of the process and increased skill level, achieving faster the required level of end product quality that will influence on customer satisfaction.

**6. Based on list, which following possible advantages could be reached by using e-learning and what advantages of them are most important (please choose three top advantages) for Skretting?**

- a. Building and delivering information knowledge faster and easier in the production area;**
- b. Operators can do the training on their own speed instead of having an intensive program. In case of a knowledge gap, an operator can go back to a specific topic of the e-learning tool;**
- c. New operators can get training as soon as possible and can be more quickly introduced to the production area;**
- d. Increasing the number of trained operators;**
- e. Training materials can be always available and new topics can be added over time;**
- f. Knowledge building can be standardised;**
- g. Based on the e-learning results, operation management can indentify the level of operator competence and find gaps in knowledge among operators;**
- h. Improving the productivity, product quality and other performance factors;**
- i. Providing continuously increasing information knowledge for operators;**
- j. Providing the operator training in widely dispersed way**

1. The first priority – h (improving the productivity, product quality and other performance factors);
2. The second priority – d (increasing the number of trained operators);
3. The third priority – a (building and delivering information knowledge faster and easier in the production area)



## **Preliminary Information**

Name: Arne Høie

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Position in company: Process engineer

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Job specification: Factory support, trouble shooting, project development

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Working in current position since: 2007

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Work experience (years): 7 years in Skretting

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Name of the organization/department: PUA (process development unit)

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Date: 02.03.2011

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Place: Stavanger, Skretting Norway

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Tel: + 47 9940 0357

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E-mail: [arne.dag.hoeie@skretting.com](mailto:arne.dag.hoeie@skretting.com)

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### **Note:**

Can we mention your name in the report? Yes

## Interview 2

### ***1. What is the competence strategy/plan in Skretting?***

We do training program for our operators by using classroom courses, conference and face to face teaching. During a classroom course our operators perform a group work and solve different tasks that related to production sector of our company. We invite external experts who share their own work experience and knowledge. Skrettings' engineers teach our operators about how equipments\* and machines\* operate in fish feed production factory.

\* - when equipments and machines were bought, maintenance and operation personnel do reconstruction and rebuilding to adapt them under required parameters and outputs.

### ***2. Why training of operators in production area is important for Skretting?***

The reasons why we do training our operators are:

- Operators responsible for all stages in fish feed production area
- Work that is performed by them is quite complicated where they must know not only current technological parameters but also they must knowledge about biological process
- Fish feed production requires a specified knowledge from our operators
- They have to be flexible in skills and knowledge as we have two lines of fish feed production, they have to have ability to operate those two lines if it is necessary

Sometimes it is necessary to teach new employees who do not know anything about fish feed production

### ***3. How do you train/teach operators at present?***

We train our operators in following methods:

- Short introduction about whole fish feed production and give a training manual book
- Operators meet with key process persons
- New operators are trained during 6 months before start to work independently
- They take a part in all stages of fish feed production and in maintenance activities

### ***4. Do you think that e-learning tool could improve the existing learning methods for the operators? Why?***

Yes, I do think that e-learning tool could improve our existing learning methods based on following reasons:

- It will be able to structure the training knowledge for operators, i.e. we will have an opportunity to indentify about which courses our operators already have had or haven't had yet
- It will be easier and more clear transformation knowledge to operators and allow us to identify the level of knowledge of each operator, consequently we can know about what kind of knowledge they do need to be competence and increase our production efficiency
- It can avoid knowledge gaps of operators and as a result it will decrease failures and stoppage in production cycle
- Operators can anytime go back to topic in case if they have lack of knowledge that is needed to perform a job in effective way

**5. What result can Skretting achieve in the production area by implementing e-learning?**

By implementing e-learning tool we will be able to achieve the results such as:

- Quality of products
- Higher availability of process and capacity of production plants
- Decreasing less complaints from customers
- Better HSE factor (health, safety and environment)
- Better standardizing of production cycle
- Increasing company competence in a market

**6. Based on list, which following possible advantages could be reached by using e-learning and what advantages of them are most important (please choose three top advantages) for Skretting?**

- a. Building and delivering information knowledge faster and easier in the production area;**
- b. Operators can do the training on their own speed instead of having an intensive program. In case of a knowledge gap, an operator can go back to a specific topic of the e-learning tool;**
- c. New operators can get training as soon as possible and can be more quickly introduced to the production area;**
- d. Increasing the number of trained operators;**
- e. Training materials can be always available and new topics can be added over time;**
- f. Knowledge building can be standardised;**
- g. Based on the e-learning results, operation management can indentify the level of operator competence and find gaps in knowledge among operators;**
- h. Improving the productivity, product quality and other performance factors;**
- i. Providing continuously increasing information knowledge for operators;**
- j. Providing the operator training in widely dispersed way**

1. The first priority – g (based on the e-learning results, operation management can identify the level of operator competence and find gaps in knowledge among operators);
2. The second priority – a (building and delivering information knowledge faster and easier in production area);
3. The third priority – e (training materials can be available and new topics can be added over time)

## **Preliminary Information**

Name: Ingrid Hjelle

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Position in company: HR manager of Skretting group

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Job specification: Human resources

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Working in current position since: 2002

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Work experience (years): 15 years

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Name of the organization/department: HR department

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Date: 01.03.2011

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Place: Stavanger, Skretting Norway

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Tel: +47 416 98 876

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E-mail: Ingrid.Hjelle@skretting.com

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### **Note:**

Can we mention your name in the report? Yes

### Interview 3

#### 1. *What is the competence strategy/plan in Skretting?*

Skretting wants to run the competence development in a targeted and systematic manner. We believe that investing in skills is important for motivation and to achieve the overall business objectives:

- The competence plan provides the overall guidance of which areas Skretting should pay attention to.
- Annual action plans for the different departments, as well as individual action plans will be based on the strategic competence plan.
- The strategic competence plan is based on input from management teams in operations, sales and marketing organization, and also from the union representatives. The management team of Skretting has further prioritized the areas that should be the main focus.
- The strategic competence plan will be evaluated annual by the management team of Skretting and adjusted if needed.
- Human recourse department is responsible for the overall planning and coordination of competence development activities.

We divide competence into three components:

- Knowledge, expertise and the basic theory (that we need to understand the tasks)
- Skills, i.e. applied expertise, techniques and methods (that we need to solve the tasks)
- Abilities and attitudes, i.e. behavior, relationships and willingness to provide (what we need to solve the tasks in the best way)

The main areas within each competency that described in details based on following sections:

#### 1. **Knowledge**

##### *Nutrition*

- Basic knowledge of fish nutrition and why our fish feed products contribute positive to the growth, health and welfare
- High degree of knowledge about our various fish feed products and applications (active nutrition)
- High degree of knowledge about models, tools and applications that they have (active control)

##### *Process (Production)*

- High level knowledge of physical control of feed quality through using of standardized best practices.
- High level knowledge of raw materials and production equipment, and their interaction in the production cycle

##### *IT / IM*

- Good knowledge of management use and technical aids (Movex, presentation, social media, office packages, mobile applications)
- Developing the use of virtual tools

#### 2. **Skills**

##### *Management*

- Understand managers role and do this on a consistent and engaging way

##### *Project Management*

- Good technical implementation of projects
- Understand the project manager role and do this in an including way

##### *Commercial understanding*

- Added value sale of standard and special products
- Professional in communication and negotiation skills

##### *Process*

- Be able to process various raw materials to gain physical and nutritional quality

### **3. Abilities and attitudes**

Employee attitudes should reflect on our values

#### *Knowledgeable*

- Employees will be characterized by great learning will

#### *Openness*

- Employees must be open and willing to share their knowledge so that we get the best possible cooperation internally and with customers/suppliers

#### *Responsible*

- Employees must take responsibility for their own development and learning processes, both in relation to their own tasks but also for the overall delivery for Skretting

#### *Innovative*

- Employees are challenged to be innovative in terms of how tasks are resolved, and have a positive attitude to the renewal.

### **2. Why training of operators in production area is important for Skretting?**

Skretting company wants to improve the quality of end products continuously. Based on this, a good quality of product can be achieved by doing competence activities and qualitative performance of responsibilities by personnel in Skretting. In addition, training can give us the cost effectiveness in production cycle, high performance of each stage in feed production, motivation to increase knowledge among operators, increase confidence in company

### **3. Do you think that e-learning tool could improve the existing learning methods for the operators? Why?**

Today we do have the following methods to train our feed production employees:

- Classroom education (for example, lectures during a few days where we do discuss about processing and product quality, and also we invite external experts who work in this area, they are determined by their knowledge)
- External and internal courses where the main aims are exchange knowledge and experience, to create better relationships and culture between our employees

### **4. Do you think that e-learning tool could improve the existing learning methods for the operators? Why?**

We can identify the level of knowledge of each operator and other personnel who work in production sector by testing through quiz of e-learning tool. The results of testing could be useful to develop our training program in Skretting, i.e. the materials can be more structured and added additional information/materials to fill gaps in knowledge of personnel.

### **5. What result can Skretting achieve in the production area by implementing e-learning?**

We could achieve the next results by implementing e-learning tool in Skretting:

- Standardized introduction program about whole production cycle for new employees
- More competent operators that could avoid mistakes in operations, consequently increasing the cost effectiveness of feed production
- More focus on learning and motivation
- A higher quality of end products
- Less complaints from our customer

6. *Based on list, which following possible advantages could be reached by using e-learning and what advantages of them are most important (please choose three top advantages) for Skretting?*
- a. *Building and delivering information knowledge faster and easier in the production area;*
  - b. *Operators can do the training on their own speed instead of having an intensive program. In case of a knowledge gap, an operator can go back to a specific topic of the e-learning tool;*
  - c. *New operators can get training as soon as possible and can be more quickly introduced to the production area;*
  - d. *Increasing the number of trained operators;*
  - e. *Training materials can be always available and new topics can be added over time;*
  - f. *Knowledge building can be standardised;*
  - g. *Based on the e-learning results, operation management can indentify the level of operator competence and find gaps in knowledge among operators;*
  - h. *Improving the productivity, product quality and other performance factors;*
  - i. *Providing continuously increasing information knowledge for operators;*
  - j. *Providing the operator training in widely dispersed way*

1. The first priority – h (improving the productivity, product quality and other performance factors)
2. The second priority – i (providing continuously increasing information knowledge for operators)
3. The third priority – f (knowledge building can be standardized)

**APPENDIX B**

**Skretting Personnel Questionnaire**



## E-learning participants' questionnaire Nº1

### Section A: Preliminary Information

|   |   |
|---|---|
| <b>Q1: Position in company:</b>                 | Operator                                    |
| <b>Q2: Describe your main responsibilities:</b> | Process checking, controlling and improving |
| <b>Q3: Work in Skretting since?</b>             | 4 years                                     |
| <b>Q4: Work in current position since?</b>      | 3 years                                     |
| <b>Q5: Country:</b>                             | Chile                                       |

### Section B: Information about your PC & Internet and English skills

**Q6: I normally access email and/or the Internet** (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

**Q7: I normally use a computer:** (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

**Q8: Approximately how many years have you been using a computer:**

16 years

**Q9: Approximately how many hours do you spend during the week at home or elsewhere on the Internet (for work, recreational and educational purposes):**

9 years

**Q10: Your English language level** (*please choose one*)

- Beginner  
 Limited  
 Good  
 Advance  
 Native

### Section C: Assessment of e-learning module

#### Technical design

**Q11: How fast does the e-learning web page open?** (*please choose one*)

- Very slow  Slow  In between  Fast  Very fast

**Q12: How easy is it to navigate inside the module?** (*please choose one*)

- Very difficult  Difficult  In between  Easy  Very easy

**Q13: What is the quality of the text and images?** *(please choose one)*

Very bad    Bad                       In between  Good            Very good

**Q14: What is the quality of the sound in the module?** *(please choose one)*

Very bad    Bad                       In between  Good            Very good

**Content design**

**Q15: How easy is it to understand the e-learning instructor?** *(please choose one)*

Very difficult    Difficult    In between  Easy            Very easy

**Q16: What do you consider the most useful type of content for your learning?**  
*(please choose from one to several)*

- Audio
- Video
- Text
- Graphics/figures
- Animations/simulations
- Images/pictures
- Other

If other, please comment your ideas/thoughts:

**Q17: How clearly is the content of the e-learning module explained?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Q18: How clear are the quiz questions that are asked?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Learning process:**

**Q19: Did you work through the whole module?** *(please choose one)*

Yes                       No

If no, please comment the reasons:

**Q20: How easy did you find it to understand the content of the module?**  
*(please choose one)*

Very difficult    Difficult    In between  Easy            Very easy

Please list any particular difficulties:

**Q21: How useful did you find the content of the e-learning module? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q22: How useful do you think the e-learning module will be to new operators? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q23: Would you recommend this e-learning module to your colleagues? (please choose one)**

Yes  No

If no, please comment your own reasons:

**Q24: Do you think you will find it useful to study other modules through an e-learning tool? (please choose one)**

Yes  No

If no, please comment your own reasons:

If yes, can you think of other topics that would be interesting for you:

All topics relationship with the process, management and conclusion tests.

**Additional questions:**

**Q25: Have you noticed any mistakes in the module? If so, please indicate what these are:**

I did not find mistakes

**Q26: What are your suggestions/improvements for the e-learning module?**

Maybe an opinion is to open the presentation with slides and comments.  
Also, where I work the ambient condition is not ideal, noisy.  
I recommend an environment where I can concentrate. So lower the used time and best understand.  
I think E-learning should be supported in part by classroom dictated by a person of the area (a little presentation focused on solving questions).

**Q27: What is your overall evaluation of the concept of the e-learning for training Skretting personnel? (please choose one)**

Very bad  Bad  In between  Positive  Very positive

## E-learning participants' questionnaire Nº2

### Section A: Preliminary Information

|   |  |
|---|--|
| <b>Q1: Position in company:</b>                 | Process Engineer                       |
| <b>Q2: Describe your main responsibilities:</b> | Trials, training and technical support |
| <b>Q3: Work in Skretting since?</b>             | 2000                                   |
| <b>Q4: Work in current position since?</b>      | 2003                                   |
| <b>Q5: Country:</b>                             | Chile                                  |

### Section B: Information about your PC & Internet and English skills

**Q6: I normally access email and/or the Internet** (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

**Q7: I normally use a computer:** (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

**Q8: Approximately how many years have you been using a computer:**

15

**Q9: Approximately how many hours do you spend during the week at home or elsewhere on the Internet** (for work, recreational and educational purposes):

3

**Q10: Your English language level** (*please choose one*)

- Beginner  
 Limited  
 Good  
 Advance  
 Native

### Section C: Assessment of e-learning module

#### Technical design

**Q11: How fast does the e-learning web page open?** (*please choose one*)

- Very slow  Slow  In between  Fast  Very fast

**Q12: How easy is it to navigate inside the module?** (*please choose one*)

- Very difficult  Difficult  In between  Easy  Very easy

**Q13: What is the quality of the text and images?** *(please choose one)*

Very bad    Bad                       In between    Good             Very good

**Q14: What is the quality of the sound in the module?** *(please choose one)*

Very bad    Bad                       In between    Good             Very good

**Content design**

**Q15: How easy is it to understand the e-learning instructor?** *(please choose one)*

Very difficult     Difficult     In between    Easy             Very easy

**Q16: What do you consider the most useful type of content for your learning?**  
*(please choose from one to several)*

- Audio
- Video
- Text
- Graphics/figures
- Animations/simulations
- Images/pictures
- Other

If other, please comment your ideas/thoughts:

**Q17: How clearly is the content of the e-learning module explained?** *(please choose one)*

Not clear    Slightly clear     Clear             Very clear

**Q18: How clear are the quiz questions that are asked?** *(please choose one)*

Not clear    Slightly clear     Clear             Very clear

**Learning process:**

**Q19: Did you work through the whole module?** *(please choose one)*

Yes                       No

If no, please comment the reasons:

**Q20: How easy did you find it to understand the content of the module?** *(please choose one)*

Very difficult     Difficult     In between    Easy             Very easy

Please list any particular difficulties:

**Q21: How useful did you find the content of the e-learning module?** *(please choose one)*

Not useful  Slightly Useful  Useful  Very useful

**Q22: How useful do you think the e-learning module will be to new operators?**  
*(please choose one)*

Not useful  Slightly Useful  Useful  Very useful

**Q23: Would you recommend this e-learning module to your colleagues?**  
*(please choose one)*

Yes  No

If no, please comment your own reasons:

The English level of our technical staff (extruder operators, project engineers, shift managers) is very low. For a better understanding, in our case, the modules need to be translated into Spanish. I feel the same problem will be happen in Japan, Italy, France, Turkey, Brazil and Spain.

**Q24: Do you think you will find it useful to study other modules though an e-learning tool?***(please choose one)*

Yes  No

If no, please comment your own reasons:

If yes, can you think of other topics that would be interesting for you:

Grinding, Mixing, Extrusion, Drying, Coating and Cooling

**Additional questions:**

**Q25: Have you noticed any mistakes in the module? If so, please indicate what these are:**

**Q26: What are your suggestions/improvements for the e-learning module?**

Translate the modules into different languages existing in Skretting plants

**Q27: What is your overall evaluation of the concept of the e-learning for training Skretting personnel?** *(please choose one)*

Very bad  Bad  In between  Positive  Very positive

## E-learning participants' questionnaire №3

### Section A: Preliminary Information

|   |                                 |
|---|---------------------------------|
| <b>Q1: Position in company:</b>                 | Process Engineer                |
| <b>Q2: Describe your main responsibilities:</b> | Process quality and improvement |
| <b>Q3: Work in Skretting since?</b>             | 2008                            |
| <b>Q4: Work in current position since?</b>      | 2011                            |
| <b>Q5: Country:</b>                             | Canada                          |

### Section B: Information about your PC & Internet and English skills

**Q6: I normally access email and/or the Internet** (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

**Q7: I normally use a computer:** (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

**Q8: Approximately how many years have you been using a computer:**

25

**Q9: Approximately how many hours do you spend during the week at home or elsewhere on the Internet (for work, recreational and educational purposes):**

3

**Q10: Your English language level** (*please choose one*)

- Beginner  
 Limited  
 Good  
 Advance  
 Native

### Section C: Assessment of e-learning module

#### Technical design

**Q11: How fast does the e-learning web page open?** (*please choose one*)

- Very slow  Slow  In between  Fast  Very fast

**Q12: How easy is it to navigate inside the module?** (*please choose one*)

- Very difficult  Difficult  In between  Easy  Very easy

**Q13: What is the quality of the text and images?** *(please choose one)*

Very bad    Bad                       In between  Good                       Very good

**Q14: What is the quality of the sound in the module?** *(please choose one)*

Very bad    Bad                       In between  Good                       Very good

**Content design**

**Q15: How easy is it to understand the e-learning instructor?** *(please choose one)*

Very difficult    Difficult    In between  Easy                       Very easy

**Q16: What do you consider the most useful type of content for your learning?**  
*(please choose from one to several)*

- Audio
- Video
- Text
- Graphics/figures
- Animations/simulations
- Images/pictures
- Other

If other, please comment your ideas/thoughts:

**Q17: How clearly is the content of the e-learning module explained?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Q18: How clear are the quiz questions that are asked?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Learning process:**

**Q19: Did you work through the whole module?** *(please choose one)*

Yes                       No

If no, please comment the reasons:

**Q20: How easy did you find it to understand the content of the module?**  
*(please choose one)*

Very difficult    Difficult    In between  Easy                       Very easy

Please list any particular difficulties:



**Q21: How useful did you find the content of the e-learning module?** *(please choose one)*

Not useful  Slightly Useful  Useful  Very useful

**Q22: How useful do you think the e-learning module will be to new operators?**  
*(please choose one)*

Not useful  Slightly Useful  Useful  Very useful

**Q23: Would you recommend this e-learning module to your colleagues?**  
*(please choose one)*

Yes  No

If no, please comment your own reasons:

**Q24: Do you think you will find it useful to study other modules through an e-learning tool?***(please choose one)*

Yes  No

If no, please comment your own reasons:

If yes, can you think of other topics that would be interesting for you:

**Additional questions:**

**Q25: Have you noticed any mistakes in the module? If so, please indicate what these are:**

**Q26: What are your suggestions/improvements for the e-learning module?**

It is a little tedious for the questionnaire to have to be completed and then attached to an email, and then be sent to you. If possible, an automatic response would be preferred? Other than that I think everything looks great!

**Q27: What is your overall evaluation of the concept of the e-learning for training Skretting personnel?** *(please choose one)*

Very bad  Bad  In between  Positive  Very positive

## E-learning participants' questionnaire №4

### Section A: Preliminary Information

|   |                                     |
|---|-------------------------------------|
| <b>Q1: Position in company:</b>                 | Operator                            |
| <b>Q2: Describe your main responsibilities:</b> | Batching mash and extruding pellets |
| <b>Q3: Work in Skretting since?</b>             | 1998                                |
| <b>Q4: Work in current position since?</b>      | 1999                                |
| <b>Q5: Country:</b>                             | Canada                              |

### Section B: Information about your PC & Internet and English skills

**Q6: I normally access email and/or the Internet** (*please choose one*)

- Very rarely, if ever
- Once or two times a month
- A few times a week
- Every day

**Q7: I normally use a computer:** (*please choose one*)

- Very rarely, if ever
- Once or two times a month
- A few times a week
- Every day

**Q8: Approximately how many years have you been using a computer:**

15

**Q9: Approximately how many hours do you spend during the week at home or elsewhere on the Internet (for work, recreational and educational purposes):**

21

**Q10: Your English language level** (*please choose one*)

- Beginner
- Limited
- Good
- Advance
- Native

### Section C: Assessment of e-learning module

#### Technical design

**Q11: How fast does the e-learning web page open?** (*please choose one*)

- Very slow    Slow                       In between    Fast                       Very fast

**Q12: How easy is it to navigate inside the module?** (*please choose one*)

- Very difficult    Difficult    In between    Easy                       Very easy

**Q13: What is the quality of the text and images?** *(please choose one)*

Very bad    Bad                       In between    Good                       Very good

**Q14: What is the quality of the sound in the module?** *(please choose one)*

Very bad    Bad                       In between    Good                       Very good

**Content design**

**Q15: How easy is it to understand the e-learning instructor?** *(please choose one)*

Very difficult    Difficult    In between    Easy                       Very easy

**Q16: What do you consider the most useful type of content for your learning?**  
*(please choose from one to several)*

- Audio
- Video
- Text
- Graphics/figures
- Animations/simulations
- Images/pictures
- Other

If other, please comment your ideas/thoughts:

**Q17: How clearly is the content of the e-learning module explained?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Q18: How clear are the quiz questions that are asked?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Learning process:**

**Q19: Did you work through the whole module?** *(please choose one)*

Yes                       No

If no, please comment the reasons:

**Q20: How easy did you find it to understand the content of the module?**  
*(please choose one)*

Very difficult    Difficult    In between    Easy                       Very easy

Please list any particular difficulties:

**Q21: How useful did you find the content of the e-learning module? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q22: How useful do you think the e-learning module will be to new operators? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q23: Would you recommend this e-learning module to your colleagues? (please choose one)**

Yes  No

If no, please comment your own reasons:

**Q24: Do you think you will find it useful to study other modules through an e-learning tool?(please choose one)**

Yes  No

If no, please comment your own reasons:

If yes, can you think of other topics that would be interesting for you:

Extruder screw configuration, die selection, other more advanced problems. Possible solutions to calcium built up. Also, I understand what SME is, but I would like it explained how the “number” is derived, the math formula used to get SME value.

**Additional questions:**

**Q25: Have you noticed any mistakes in the module? If so, please indicate what these are:**

The issues were more with the problems with our internet connection at this Skretting location, our connection is very slow and the presentation stopped every so often, this was not a problem with the module, more an issue here.

**Q26: What are your suggestions/improvements for the e-learning module?**

I think that for a beginner or new operator this presentation would be extremely helpful. I think perhaps some “actual” video clips would have been helpful, visual aids were good, but actual images of running machines/conditioners would help as many make a connection more easily to a lesson when there are video images that pertain directly to their work environment.

**Q27: What is your overall evaluation of the concept of the e-learning for training Skretting personnel? (please choose one)**

Very bad  Bad  In between  Positive  Very positive

## E-learning participants' questionnaire №5

### Section A: Preliminary Information

|  |   |
|--|---|
| Q1: Position in company:                 | Process Engineer                          |
| Q2: Describe your main responsibilities: | Supporting operators, developing products |
| Q3: Work in Skretting since?             | 2000                                      |
| Q4: Work in current position since?      | 2009                                      |
| Q5: Country:                             | Australia                                 |

### Section B: Information about your PC & Internet and English skills

Q6: I normally access email and/or the Internet (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

Q7: I normally use a computer: (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

Q8: Approximately how many years have you been using a computer:

20

Q9: Approximately how many hours do you spend during the week at home or elsewhere on the Internet (for work, recreational and educational purposes):

10

Q10: Your English language level (*please choose one*)

- Beginner  
 Limited  
 Good  
 Advance  
 Native

### Section C: Assessment of e-learning module

#### Technical design

Q11: How fast does the e-learning web page open? (*please choose one*)

- Very slow  Slow  In between  Fast  Very fast

Q12: How easy is it to navigate inside the module? (*please choose one*)

- Very difficult  Difficult  In between  Easy  Very easy

**Q13: What is the quality of the text and images?** *(please choose one)*

Very bad    Bad                       In between  Good            Very good

**Q14: What is the quality of the sound in the module?** *(please choose one)*

Very bad    Bad                       In between  Good            Very good

**Content design**

**Q15: How easy is it to understand the e-learning instructor?** *(please choose one)*

Very difficult    Difficult    In between  Easy            Very easy

**Q16: What do you consider the most useful type of content for your learning?**  
*(please choose from one to several)*

- Audio
- Video
- Text
- Graphics/figures
- Animations/simulations
- Images/pictures
- Other

If other, please comment your ideas/thoughts:

**Q17: How clearly is the content of the e-learning module explained?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Q18: How clear are the quiz questions that are asked?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Learning process:**

**Q19: Did you work through the whole module?** *(please choose one)*

Yes                       No

If no, please comment the reasons:

**Q20: How easy did you find it to understand the content of the module?**  
*(please choose one)*

Very difficult    Difficult    In between  Easy            Very easy

Please list any particular difficulties:

**Q21: How useful did you find the content of the e-learning module?** *(please choose one)*

Not useful  Slightly Useful  Useful  Very useful

**Q22: How useful do you think the e-learning module will be to new operators?**  
*(please choose one)*

Not useful  Slightly Useful  Useful  Very useful

**Q23: Would you recommend this e-learning module to your colleagues?** *(please choose one)*

Yes  No

If no, please comment your own reasons:

**Q24: Do you think you will find it useful to study other modules through an e-learning tool?**

*(please choose one)*

Yes  No

If no, please comment your own reasons:

If yes, can you think of other topics that would be interesting for you:

**Additional questions:**

**Q25: Have you noticed any mistakes in the module? If so, please indicate what these are:**

**Q26: What are your suggestions/improvements for the e-learning module?**

Keep the topics focused on useful facts and information. I don't think our operators care about why steam enters at the bottom and water at the top. They just want to know how to fix product issues and understand why they experience issues.

**Q27: What is your overall evaluation of the concept of the e-learning for training Skretting personnel?** *(please choose one)*

Very bad  Bad  In between  Positive  Very positive

## E-learning participants' questionnaire №6

### Section A: Preliminary Information

|  |                                |
|--|--------------------------------|
| Q1: Position in company:                 | Operator                       |
| Q2: Describe your main responsibilities: | Run extruder and service shift |
| Q3: Work in Skretting since?             | 1976                           |
| Q4: Work in current position since?      | 1986                           |
| Q5: Country:                             | Australia                      |

### Section B: Information about your PC & Internet and English skills

Q6: I normally access email and/or the Internet (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

Q7: I normally use a computer: (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

Q8: Approximately how many years have you been using a computer:

3

Q9: Approximately how many hours do you spend during the week at home or elsewhere on the Internet (for work, recreational and educational purposes):

2

Q10: Your English language level (*please choose one*)

- Beginner  
 Limited  
 Good  
 Advance  
 Native

### Section C: Assessment of e-learning module

#### Technical design

Q11: How fast does the e-learning web page open? (*please choose one*)

- Very slow  Slow  In between  Fast  Very fast

Q12: How easy is it to navigate inside the module? (*please choose one*)

- Very difficult  Difficult  In between  Easy  Very easy



**Q13: What is the quality of the text and images?** *(please choose one)*

Very bad    Bad                       In between  Good                       Very good

**Q14: What is the quality of the sound in the module?** *(please choose one)*

Very bad    Bad                       In between  Good                       Very good

**Content design**

**Q15: How easy is it to understand the e-learning instructor?** *(please choose one)*

Very difficult    Difficult    In between  Easy                       Very easy

**Q16: What do you consider the most useful type of content for your learning?**  
*(please choose from one to several)*

- Audio
- Video
- Text
- Graphics/figures
- Animations/simulations
- Images/pictures
- Other

If other, please comment your ideas/thoughts:

**Q17: How clearly is the content of the e-learning module explained?** *(please choose one)*

Not clear    Slightly clear                       Clear                       Very clear

**Q18: How clear are the quiz questions that are asked?** *(please choose one)*

Not clear    Slightly clear                       Clear                       Very clear

**Learning process:**

**Q19: Did you work through the whole module?** *(please choose one)*

Yes                       No

If no, please comment the reasons:

**Q20: How easy did you find it to understand the content of the module?** *(please choose one)*

Very difficult    Difficult    In between  Easy                       Very easy

Please list any particular difficulties:

**Q21: How useful did you find the content of the e-learning module? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q22: How useful do you think the e-learning module will be to new operators? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q23: Would you recommend this e-learning module to your colleagues? (please choose one)**

Yes  No

If no, please comment your own reasons:

**Q24: Do you think you will find it useful to study other modules through an e-learning tool? (please choose one)**

Yes  No

If no, please comment your own reasons:

If yes, can you think of other topics that would be interesting for you:

**Additional questions:**

**Q25: Have you noticed any mistakes in the module? If so, please indicate what these are:**

**Q26: What are your suggestions/improvements for the e-learning module?**

**Q27: What is your overall evaluation of the concept of the e-learning for training Skretting personnel? (please choose one)**

Very bad  Bad  In between  Positive  Very positive

## E-learning participants' questionnaire №7

### Section A: Preliminary Information

|   |                                |
|---|--------------------------------|
| <b>Q1: Position in company:</b>                 | Operator                       |
| <b>Q2: Describe your main responsibilities:</b> | Operating the extruder process |
| <b>Q3: Work in Skretting since?</b>             | 2010                           |
| <b>Q4: Work in current position since?</b>      | 2010                           |
| <b>Q5: Country:</b>                             | Norway                         |

### Section B: Information about your PC & Internet and English skills

**Q6: I normally access email and/or the Internet** (*please choose one*)

- Very rarely, if ever
- Once or two times a month
- A few times a week
- Every day

**Q7: I normally use a computer:** (*please choose one*)

- Very rarely, if ever
- Once or two times a month
- A few times a week
- Every day

**Q8: Approximately how many years have you been using a computer:**

15

**Q9: Approximately how many hours do you spend during the week at home or elsewhere on the Internet** (for work, recreational and educational purposes):

0

**Q10: Your English language level** (*please choose one*)

- Beginner
- Limited
- Good
- Advance
- Native

### Section C: Assessment of e-learning module

#### Technical design

**Q11: How fast does the e-learning web page open?** (*please choose one*)

- Very slow    Slow                       In between    Fast                       Very fast

**Q12: How easy is it to navigate inside the module?** (*please choose one*)

- Very difficult    Difficult    In between    Easy                       Very easy

**Q13: What is the quality of the text and images?** *(please choose one)*

Very bad    Bad                       In between  Good                       Very good

**Q14: What is the quality of the sound in the module?** *(please choose one)*

Very bad    Bad                       In between  Good                       Very good

**Content design**

**Q15: How easy is it to understand the e-learning instructor?** *(please choose one)*

Very difficult    Difficult    In between  Easy                       Very easy

**Q16: What do you consider the most useful type of content for your learning?**  
*(please choose from one to several)*

- Audio
- Video
- Text
- Graphics/figures
- Animations/simulations
- Images/pictures
- Other

If other, please comment your ideas/thoughts:

**Q17: How clearly is the content of the e-learning module explained?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Q18: How clear are the quiz questions that are asked?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Learning process:**

**Q19: Did you work through the whole module?** *(please choose one)*

Yes                       No

If no, please comment the reasons:

**Q20: How easy did you find it to understand the content of the module?**  
*(please choose one)*

Very difficult    Difficult    In between  Easy                       Very easy

Please list any particular difficulties:

**Q21: How useful did you find the content of the e-learning module? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q22: How useful do you think the e-learning module will be to new operators? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q23: Would you recommend this e-learning module to your colleagues? (please choose one)**

Yes  No

If no, please comment your own reasons:

**Q24: Do you think you will find it useful to study other modules through an e-learning tool? (please choose one)**

Yes  No

If no, please comment your own reasons:

If yes, can you think of other topics that would be interesting for you:

**Additional questions:**

**Q25: Have you noticed any mistakes in the module? If so, please indicate what these are:**

**Q26: What are your suggestions/improvements for the e-learning module?**

**Q27: What is your overall evaluation of the concept of the e-learning for training Skretting personnel? (please choose one)**

Very bad  Bad  In between  Positive  Very positive

## E-learning participants' questionnaire №8

### Section A: Preliminary Information

|   |                               |
|---|-------------------------------|
| <b>Q1: Position in company:</b>                 | Process Engineer              |
| <b>Q2: Describe your main responsibilities:</b> | Production people (operators) |
| <b>Q3: Work in Skretting since?</b>             | 1995                          |
| <b>Q4: Work in current position since?</b>      | 2001                          |
| <b>Q5: Country:</b>                             | Norway                        |

### Section B: Information about your PC & Internet and English skills

**Q6: I normally access email and/or the Internet** (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

**Q7: I normally use a computer:** (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

**Q8: Approximately how many years have you been using a computer:**

25

**Q9: Approximately how many hours do you spend during the week at home or elsewhere on the Internet** (for work, recreational and educational purposes):

12

**Q10: Your English language level** (*please choose one*)

- Beginner  
 Limited  
 Good  
 Advance  
 Native

### Section C: Assessment of e-learning module

#### Technical design

**Q11: How fast does the e-learning web page open?** (*please choose one*)

- Very slow  Slow  In between  Fast  Very fast

**Q12: How easy is it to navigate inside the module?** (*please choose one*)

- Very difficult  Difficult  In between  Easy  Very easy

**Q13: What is the quality of the text and images?** *(please choose one)*

Very bad    Bad                       In between    Good             Very good

**Q14: What is the quality of the sound in the module?** *(please choose one)*

Very bad    Bad                       In between    Good             Very good

**Content design**

**Q15: How easy is it to understand the e-learning instructor?** *(please choose one)*

Very difficult     Difficult     In between    Easy             Very easy

**Q16: What do you consider the most useful type of content for your learning?**  
*(please choose from one to several)*

- Audio
- Video
- Text
- Graphics/figures
- Animations/simulations
- Images/pictures
- Other

If other, please comment your ideas/thoughts:

**Q17: How clearly is the content of the e-learning module explained?** *(please choose one)*

Not clear    Slightly clear     Clear                       Very clear

**Q18: How clear are the quiz questions that are asked?** *(please choose one)*

Not clear    Slightly clear     Clear                       Very clear

**Learning process:**

**Q19: Did you work through the whole module?** *(please choose one)*

Yes                       No

If no, please comment the reasons:

I could not get time to look through all part but I have seen the main parts

**Q20: How easy did you find it to understand the content of the module?**  
*(please choose one)*

Very difficult     Difficult     In between    Easy             Very easy

Please list any particular difficulties:

**Q21: How useful did you find the content of the e-learning module? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q22: How useful do you think the e-learning module will be to new operators? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q23: Would you recommend this e-learning module to your colleagues? (please choose one)**

Yes  No

If no, please comment your own reasons:

**Q24: Do you think you will find it useful to study other modules through an e-learning tool? (please choose one)**

Yes  No

If no, please comment your own reasons:

If yes, can you think of other topics that would be interesting for you:

**Additional questions:**

**Q25: Have you noticed any mistakes in the module? If so, please indicate what these are:**

**Q26: What are your suggestions/improvements for the e-learning module?**

I think it would be advantage if the language is Norwegian

**Q27: What is your overall evaluation of the concept of the e-learning for training Skretting personnel? (please choose one)**

Very bad  Bad  In between  Positive  Very positive



## E-learning participants' questionnaire N°9

### Section A: Preliminary Information

|  |                            |
|--|----------------------------|
| Q1: Position in company:                 | Process Engineer           |
| Q2: Describe your main responsibilities: | Production and maintenance |
| Q3: Work in Skretting since?             | 2005                       |
| Q4: Work in current position since?      | 2009                       |
| Q5: Country:                             | France                     |

### Section B: Information about your PC & Internet and English skills

Q6: I normally access email and/or the Internet (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

Q7: I normally use a computer: (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

Q8: Approximately how many years have you been using a computer:

10

Q9: Approximately how many hours do you spend during the week at home or elsewhere on the Internet (for work, recreational and educational purposes):

3

Q10: Your English language level (*please choose one*)

- Beginner  
 Limited  
 Good  
 Advance  
 Native

### Section C: Assessment of e-learning module

#### Technical design

Q11: How fast does the e-learning web page open? (*please choose one*)

- Very slow  Slow  In between  Fast  Very fast

Q12: How easy is it to navigate inside the module? (*please choose one*)

- Very difficult  Difficult  In between  Easy  Very easy

**Q13: What is the quality of the text and images?** *(please choose one)*

Very bad    Bad                       In between  Good                       Very good

**Q14: What is the quality of the sound in the module?** *(please choose one)*

Very bad    Bad                       In between  Good                       Very good

**Content design**

**Q15: How easy is it to understand the e-learning instructor?** *(please choose one)*

Very difficult    Difficult    In between  Easy                       Very easy

**Q16: What do you consider the most useful type of content for your learning?**  
*(please choose from one to several)*

- Audio
- Video
- Text
- Graphics/figures
- Animations/simulations
- Images/pictures
- Other

If other, please comment your ideas/thoughts:

**Q17: How clearly is the content of the e-learning module explained?** *(please choose one)*

Not clear    Slightly clear                       Clear                       Very clear

**Q18: How clear are the quiz questions that are asked?** *(please choose one)*

Not clear    Slightly clear                       Clear                       Very clear

**Learning process:**

**Q19: Did you work through the whole module?** *(please choose one)*

Yes                       No

If no, please comment the reasons:

**Q20: How easy did you find it to understand the content of the module?**  
*(please choose one)*

Very difficult    Difficult    In between  Easy                       Very easy

Please list any particular difficulties:

**Q21: How useful did you find the content of the e-learning module? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q22: How useful do you think the e-learning module will be to new operators? (please choose one)**

Not useful  Slightly Useful  Useful  Very useful

**Q23: Would you recommend this e-learning module to your colleagues? (please choose one)**

Yes  No

If no, please comment your own reasons:

**Q24: Do you think you will find it useful to study other modules through an e-learning tool? (please choose one)**

Yes  No

If no, please comment your own reasons:

If yes, can you think of other topics that would be interesting for you:

**Additional questions:**

**Q25: Have you noticed any mistakes in the module? If so, please indicate what these are:**

**Q26: What are your suggestions/improvements for the e-learning module?**

**Q27: What is your overall evaluation of the concept of the e-learning for training Skretting personnel? (please choose one)**

Very bad  Bad  In between  Positive  Very positive

## E-learning participants' questionnaire №10

### Section A: Preliminary Information

|  |                 |
|--|-----------------|
| Q1: Position in company:                 | Operator        |
| Q2: Describe your main responsibilities: | Process control |
| Q3: Work in Skretting since?             | 2008            |
| Q4: Work in current position since?      | 2001            |
| Q5: Country:                             | Japan           |

### Section B: Information about your PC & Internet and English skills

Q6: I normally access email and/or the Internet (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

Q7: I normally use a computer: (*please choose one*)

- Very rarely, if ever  
 Once or two times a month  
 A few times a week  
 Every day

Q8: Approximately how many years have you been using a computer:

8

Q9: Approximately how many hours do you spend during the week at home or elsewhere on the Internet (for work, recreational and educational purposes):

14

Q10: Your English language level (*please choose one*)

- Beginner  
 Limited  
 Good  
 Advance  
 Native

### Section C: Assessment of e-learning module

#### Technical design

Q11: How fast does the e-learning web page open? (*please choose one*)

- Very slow  Slow  In between  Fast  Very fast

Q12: How easy is it to navigate inside the module? (*please choose one*)

- Very difficult  Difficult  In between  Easy  Very easy

**Q13: What is the quality of the text and images?** *(please choose one)*

Very bad    Bad                       In between  Good                       Very good

**Q14: What is the quality of the sound in the module?** *(please choose one)*

Very bad    Bad                       In between  Good                       Very good

**Content design**

**Q15: How easy is it to understand the e-learning instructor?** *(please choose one)*

Very difficult    Difficult    In between  Easy                       Very easy

**Q16: What do you consider the most useful type of content for your learning?**  
*(please choose from one to several)*

- Audio
- Video
- Text
- Graphics/figures
- Animations/simulations
- Images/pictures
- Other

If other, please comment your ideas/thoughts:

**Q17: How clearly is the content of the e-learning module explained?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Q18: How clear are the quiz questions that are asked?** *(please choose one)*

Not clear    Slightly clear    Clear                       Very clear

**Learning process:**

**Q19: Did you work through the whole module?** *(please choose one)*

Yes                       No

If no, please comment the reasons:

**Q20: How easy did you find it to understand the content of the module?**  
*(please choose one)*

Very difficult    Difficult    In between  Easy                       Very easy

Please list any particular difficulties:

**Q21: How useful did you find the content of the e-learning module?** *(please choose one)*

Not useful  Slightly Useful  Useful  Very useful

**Q22: How useful do you think the e-learning module will be to new operators?**  
*(please choose one)*

Not useful  Slightly Useful  Useful  Very useful

**Q23: Would you recommend this e-learning module to your colleagues?**  
*(please choose one)*

Yes  No

If no, please comment your own reasons:

**Q24: Do you think you will find it useful to study other modules through an e-learning tool?** *(please choose one)*

Yes  No

If no, please comment your own reasons:

If yes, can you think of other topics that would be interesting for you:

**Additional questions:**

**Q25: Have you noticed any mistakes in the module? If so, please indicate what these are:**

**Q26: What are your suggestions/improvements for the e-learning module?**

**Q27: What is your overall evaluation of the concept of the e-learning for training Skretting personnel?** *(please choose one)*

Very bad  Bad  In between  Positive  Very positive