

## **Hey, remember to add motivational design to your e-learning**

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### **ABSTRACT**

Student motivation is an essential component of all educational and learning processes. Without motivation, students lack cognitive presence resulting in little, if any, learning. In the traditional classroom setting, it's up to the teacher to facilitate and maintain student motivation. In an e-learning course however, there is less teacher or facilitator presence and the learner is left alone to interact with the instruction mostly alone. E-learning designers and developers must integrate appropriate motivational elements to ensure the learner sustains his/her motivation throughout the entire instruction to maximize the learning outcome. Over the past few years the Norwegian Armed Forces (NoAF) has incorporated motivational design elements focused on promoting and sustaining motivation into our e-learning courses based on John Keller's ARCS Model of Motivational Design. This paper outlines the rationale, methodology, and resulting implementation.

### **ABOUT THE AUTHORS**

**Commander (CDR) Geir Isaksen** has more than twelve years in the field of Advanced Distributed Learning (ADL) and has been responsible for more than twenty e-learning projects, and different R&D projects in the field of e-learning, m-learning, online learning, standardization and emerging technologies. CDR Isaksen has a master's degree in information computer technology & learning from the University of Aalborg (2014) and a bachelor's degree in electrical engineering, from Vestfold University College (1998). In addition, he has completed several university courses in pedagogies, learning styles and crew resource management. CDR Isaksen holds the position as an ADL Staff Officer at the Norwegian Defense University College (NoDUC)/ADL office, where he is responsible for leading and coordinating procurement, development and implementation of ADL projects. His military background is from the Navy, serving on submarines for six years as an electro engineer. CDR Isaksen spent two years as the head instructor in the technical simulator at the Royal Norwegian Submarine School before he started to work at the ADL office in 2002. He was a member of the NATO Training Group Task Group IT/ED from 2005 to 2012, where he was the ADL subgroup chairman until May 2011. As the Norwegian ADL Partnership executive director and a member of the NORDEFECO ADL forum of experts, he works closely with international cooperation. He has also been responsible for the planning and execution of the Nordic Defense ADL conference since 2006 and in 2015 he rejoined the NATO Training Group Task Group IT/ED as a Norwegian delegate.

**Siren Elise Frøylog Hole** has years of experience in design and development of online learning/courses and a background in digital marketing. She holds a BA in Culture and society, an MA in English literature and an MA in Science and technology studies. Hole is now a project manager and scriptwriter at Transform AS, where she works in close collaboration with NoDUC/ADL office, engaging in the production of e-learning courses from the beginning of the process until completion.

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### INTRODUCTION

The Norwegian Defense University College (NoDUC) has overseen the development of e-learning within the Norwegian Armed Forces (NoAF) since 2001. During this time, NoDUC has searched for a mechanism to ensure student motivation remains high through each of the interactive designs leading up to the development of an e-learning course.

At the 2014 IITSEC, Isaksen presented on how multimedia elements should be used in e-learning to optimize conditions for the learner to process new information and reduce student dropout (Isaksen, 2014). The basic e-learning situation described by Isaksen et al. (2014, p.2) shows how the absence of a traditional instructor in an e-learning program requires the program itself to maintain that role.

This paper takes a closer look at how e-learning should be developed to nurture and maintain student motivation, throughout an e-learning course. According to Roxana Moreno: *“there is no cognitive presence without motivation”* (Sorden, 2013, p11) and if so, this emphasizes the importance of maintaining a high student motivation. The challenges of the teachers, instructors and developers are not only to gain a learner's attention but also maintain it throughout the e-learning course.



**Figure 1. The e-learning situation - without teacher presence**

This project is a cooperation between NoDUC and Transform AS, where the first phase, covered in this paper, consists of identification and illustration of examples on how motivational design elements are implemented in new defense e-learning courses. The second step will follow in 2016, where a series of trials will be conducted to document the effect of the motivational strategies implemented in the new e-learning courses.

#### What is Motivation

In general, motivation is a term that seeks to explain the deeper reasons of why humans do the things we do. Kaufmann & Kaufmann (1998) define Motivation as: *“The biological, psychological and social factors that activate, provide direction and maintain behavior in varying degrees of intensity in relation to goal achievement”* (Keller, 2010, p4). In other words, the degree of motivation determines how actively or intensive humans choose to pursue their goals. Ken Jennings (2015) argues engagement and curiosity drive learning and retention. In terms of e-learning development, the course must engage and entice the learner using motivational tactics in its design.

According to Keller (2010) motivational theories can be divided into four categories. The first is based on human physiology and neurology; the second is a behavioral approach and is based on well-known theories like operant and classical conditioning; the third includes theories based on cognitive theories; and the fourth consists of motivational theories based on studies on emotion and affect (Keller, 2010, p4). Consequently, the field of motivational design is influenced by a number of theories and approaches, reflecting the complexity and many opportunities for implementing motivational strategies into e-learning courses.

## MOTIVATIONAL DESIGN

The difference between motivational theories and motivational design are explained by Keller (2010) by comparing the distinction between theories of learning/instruction and instructional design. His assumption is that a course designer must analyze the situation and apply the appropriate motivational designs and strategies, in the same way an instructional designer must analyze the training needs and apply appropriate instructional designs and strategies. It suggests that motivational design is not isolated from other types of design, but closely linked with both the instructional design and the learning environment design is linked with motivational design (Keller, 2015, p23) as shown in figure 2.

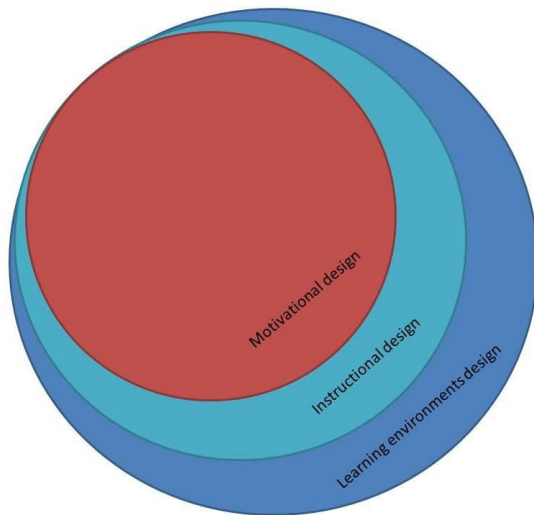


Figure 2. Link between designs (Keller, 2010)

A motivational design process is like many other design processes focused on collecting relevant background information; analyzing the target group and other factors that may influence the result; designing and implementing suitable strategies; and evaluating the result to see if you succeeded. The motivational design can be considered as the foundation for both the instructional and learning environment design.

### The ARCS-V Model

Professor Keller has developed a macro model of motivation and performance and he categorizes motivational elements into five main areas (Keller, 2010, p6). The first category, **Attention**, focuses on maintaining the learner's attention all the way through the e-learning course. This category covers elements such as avoiding boredom and stimulating excitement and curiosity. The second, **Relevance**, aggregates areas

like the need of knowing goals and purpose, viewing the achievements along the way and affiliation to the learner's work and individual needs. The third, **Confidence**, focuses on elements such as students' own belief in their ability to fulfill and pass the course, self-control over the learning process, and the satisfaction of using their existing knowledge along the way. The fourth, **Satisfaction**, focuses on elements such as the need to be treated fairly, intrinsic satisfaction, and rewards or other positive outcomes. In recent years, **Volition** has been added to the model. Volition refers to learners abilities to maintain their strong intentions, take actions and self-regulate.

The ARCS-V model is not alone in promoting these elements. Several other models, principles and theories discuss similar factors influencing motivation. In "Motivation and online learning", Isaksen, Nilsen & Ramberg (2004) analyzed several motivational theories, like the CANE model developed by Richard E. Clark, "The objective theory of motivation" by Edwin Locke & Gary P. Lathams and Herzberg's two factor model (Isaksen et al, 2004, p10). This resulted in six factors that summarize the most relevant elements related to internal motivation in connection with online learning or in this case an e-learning courses (Isaksen et al, 2004, p11), shown in table 1.

Table 1. Aggregation of Motivational Factors from Isaksen, et al (2004)

<b>Objective/goals</b>	It is important to communicate course objectives and goals. Provide students with an understanding of what they are supposed to learn. Highlight course importance for themselves and the organization.
<b>Involvement</b>	Ensure the students are involved in the learning process by using interactivity and giving them tasks and problems to solve along the way.
<b>Feedback</b>	Focus on positive outcomes and give them continual feedback on their progress.
<b>Emotions</b>	Aim at trigger emotions like curiosity and excitement to foster engagement and strong student intentions of completing the course.

<b>Socialisation and belonging</b>	Although this element is hard to comply with in an e-learning course, there are some elements that may be added. For example, focus on the student's role in the organization and how he/she is a vital part of the same.
<b>Self-efficacy</b>	Communicate the effort required by the students in a manner that increases their own belief in their ability to successfully complete the course. Don't make the instructional and performance hurdles too high.

Although these elements may appear intuitively a part of motivation, many e-learning courses fail to integrate them. A course following the opposite actions of those listed above will most likely result in learners losing motivation to complete such an e-learning course.

Most students come to any course, ready to learn with a relatively high internal motivation. Any change in their motivation is due to either the instructor or the instructional design (Keller, 2015). As discussed earlier, there is no instructor present in an e-learning course, thus it's up to the instructional and learning environment design to incorporate motivational strategies.

Another example is the MAKVISE teaching principles, defined by Nordskog & Popperud in 2000, where we find the following elements:

**Table 2. MAKVISE teaching principles**

<b>Motivation</b>	It is important to nurture students motivation in all types of learning and teaching
<b>Activation</b>	Allow the students to take a more active part in their own learning process, allowing them to solve problems and tasks
<b>K for concretization</b>	Relates to the importance to specify the learning outcome and what they are suppose focus on.
<b>Variation</b>	Focuses on the importance of presenting a variety of learning content and types of tasks, to avoid boredom
<b>Individualization</b>	Is about trying to customize the instructional design and learning content to the needs of the individual learner.
<b>S for cooperation</b>	Focuses on the importance of letting the students work together. Of course this is an element hard to fulfill in a traditional e-learning course
<b>Evaluation</b>	Focusing on allowing the student to evaluate their performance and progress, helping them maintain a belief that they are actually leaning things.

Many of these elements can be found both in the ARCS-V model and the aggregation of factors from Isaksen et al (2004). Nordskog & Popperud (2000) argue that **Motivation** is so important that it is a factor all on its own.

Well-known motivational theories reveal similarities with the ARCS-V model with foci on many of the same factors and elements. According to Keller (2015), the aim for course designers should be to use motivational strategies that keep the learners motivation on an acceptable level. The goal should be to keep the students focused, dedicated, energized and persistent, avoiding the motivation to become either too low or too high, resulting in a decreased performance (fig 3), (Keller, 2015, p18). To minimize the risk of low performance, it is important to know your target audience and to create an applicable motivational design prior to development.

Late in 2014, NoDUC implemented the ARCS-V model as a tool for developing motivational design in our new e-learning course. Together with Transform AS, NoDUC has used the ARCS-V model as a reference when planning and developing new e-learning courses.

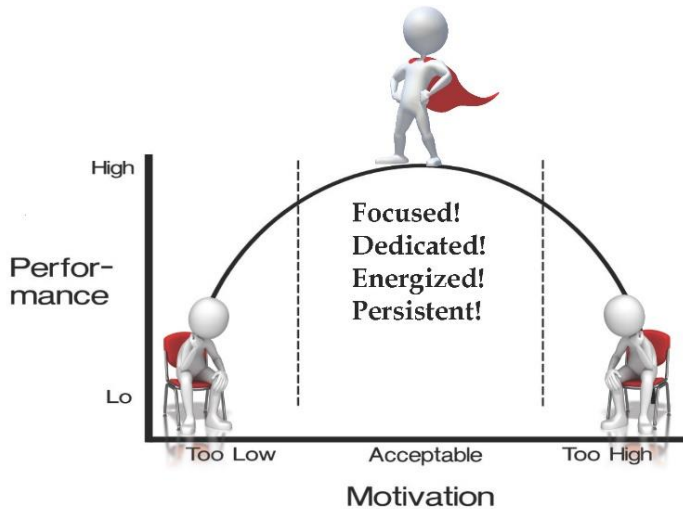


Figure 3. ARCS-V Audience analysis (Keller, 2015, p18)

### Brief Overview of The E-learning Courses

The three courses reviewed in this project have been developed and produced within the same overarching framework, but the fields in question and the students are diverse and varied. Accordingly, each course comes with its own scope, obstacles, challenges and requirements; aspects that are extremely crucial in the initial phases of the development. The first course is a basic introduction for personnel serving on Ula class submarines (UCS), focusing on basic safety measurements and acquiring knowledge about the principle functions, workings and construction of a submarine. The second course covers the NoAF process for operational planning (OP), and introduces the NATO-based methodology and the usage of the Norwegian Operational Planning Handbook (Handbook). The third and last course is Basic Introduction to Demolition (BID), covering the theoretical knowledge needed to conduct demolitions in a military operational environment.

### The Process in Practice

When developing e-learning courses, motivational variables become particularly important because no physical instructor is present to guide or aid the learner. Furthermore, the motivational tactics we choose to include in our courses cannot be changed as easily as in traditional classroom courses. In such courses, the development does not necessarily include an interdisciplinary team of scriptwriters, specialists in the field in question, designers, animators, programmers, and directors. If a strategy or tactic fails to motivate the students, the instructor can adapt his/her approach.

Because changing an e-learning course can be both costly and demanding, the development process needs to be finely tuned, systematic and accurate. Multiple questions require consideration such as: How do we design a course that is both engaging and enables the students to maintain their motivation throughout the course? How can we motivate when there is no teacher present and the learner is left alone to interact with the computer-based courseware? An example of such a challenge could be, if the subject matter is boring, but necessary to learn, what kind of motivational strategies is essential to incorporate in the course to keep the target group motivated?

To avoid the pitfalls of dropout due to boring content, non-user friendly interfaces, cognitive overload and other dropout factors, the practical utility of the ARCS Model and Keller's systematic process of motivational design was chosen as the appropriate framework. The model's practical advantage has been validated by numerous research projects, both in field studies and by research studies in several settings (Keller 2010, Shellnut, Knowlton, & Savage 1999, Keller 1984). As such the ARCS design process and the ARCS Model present a method suitable for the entire workflow before a production, and present the background for the following examples. The model also synthesizes elements from several other theories concerning motivation.

The following section will elaborate how ARCS-V principles were implemented in e-learning courses and show specific examples from some of the e-learning courses developed for NoAF.

### EXAMPLES OF MOTIVATIONAL DESIGN FROM ARMED FORCES E-LEARNING COURSES

To reiterate, the first stage in this collaborative project between NoDUC and Transform AS was to integrate motivational design in three advanced e-learning courses that are now in production. This provides the foundational work for the next stage, where we will conduct a series of trials to document and analyze the effect of developing courses with motivational design.

## Training Needs Analysis

The starting point of any e-learning course development project is the Training Needs Analysis (TNA). The TNA serves as a mechanism to collect information about the target group, learning goals, effect goals, instructor qualification, technical standardization, existing content and so forth. This information is background material used to analyse both motivational and learning strategies. An approved TNA will be the foundation for developing concept, script and finally the complete e-learning course.

In the development project for the three courses in question, the TNA's for each course have been used together with the ARCS-V to develop suitable and appropriate motivational strategies and design. One example includes the UCS course. The TNA states that this course will be challenging for many of the students, but it is important that the students meet all the learning goals in order to safely perform their duties on-board the submarine (Gabrielsen & Eide, 2013). It was a concern that, being a challenging course, it could be a problem to keep the student's attention and self-efficacy on a high level throughout the whole course. This was used together with the ARCS-V model to come up with the appropriate motivational design to meet this challenge. This methodology was used for all the three courses in question and at the same time we tried to implement as many elements as possible, derived from the ARCS-V model that could have a positive influence on students motivation.

## MOTIVATIONAL DESIGN IN THE COURSES

In alignment with the ARCS-V model, an e-learning course should be designed and developed to maintain the learner's attention by stimulating their curiosity and desire to actively take part in the learning process. The design should also aim to make the learning applicable to both their existing and future knowledge, emphasizing the relevance of what they are about to learn. If possible learners should be able to navigate their own learning experience resulting in customized content. The design should provide the learner the opportunity to apply knowledge and skills and nurture the commitment and the intentions the learner made by seeking out this course. The present examples are but a selection of motivational tactics resulting from the challenges identified in the TNA's, the ARCS design process and the ARCS model synthesis of motivational principles.

### Starting off with a motivational boost

Normally, new NODAF e-learning courses begin with a teaser trailer (short video 1.5 to 4 minutes in length) that incorporates several elements from the ARCS-V model. The teaser is used to clarify the learning requirements (**Attention**), provide sneak peeks from what is to come (**Confidence**), explicitly communicate the future worth (**Relevance**), and demonstrate other positive outcomes of completing the course (**Satisfaction**). The introductory portion is especially important because it is the learner's first encounter with the course, and his/her initial emotional response will influence their intentions to complete the course (**Volition**). Thus, these teasers also aim at boosting the learner's curiosity by way of highlighting characteristics that are unique for each course. In this case we use the unique submarine history and the use of a ground breaking 3D environment of the submarine interior to nurture the student's curiosity (**Attention**).

As such, an array of elements from different parts of the ARCS-V model come together in one single movie and multimedia element. An example of a teaser trailer that affects the student's confidence is from the newly developed ULA submarine course. The introduction video focuses on multiple elements including the proud history of the Norwegian submarine service, that very few people get to serve on submarines, that everyone onboard a submarine is important, and that the crew's safety at any given time is dependent on everybody having the right knowledge and skills. It also emphasizes that, by completing this e-learning course the students are on their way to becoming one of very few that qualifies to serve on a ULA class submarine. This focuses on giving the target group a sense of being chosen and unique.



Figure 4. Screenshot from the UCS teaser





Figure 5. Screenshot from BID teaser

Another example is found in BID teaser. In this course an important motivational device is that the course is structured according to a narrative and uses a plot and a mission to communicate the learning material. The story combines cliff hangers and suspense with instructional films and intricate theoretical information (**Attention**). In the teaser the learner is presented to the storyline, some of the highlights from the story and is told how he or she will play an important part in solving the mission (**Attention**). While the visual track focuses on exciting images from the story, the verbal track covers the learning requirements and overarching goals (**Confidence**). By having the verbal and visual track complementing each other, the learner is told what to expect from the course as well as what is expected from him/her.

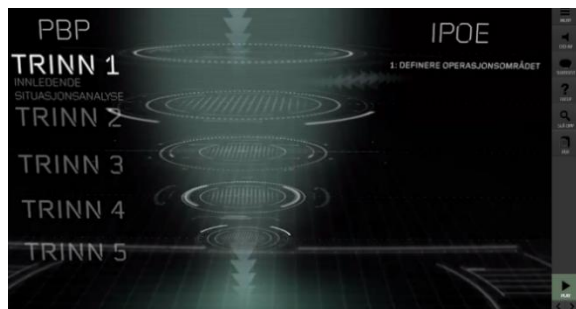


Figure 6. Screenshot from OP teaser

The teaser for the OP course presents a third example. This is an extensive course divided into six modules that requires more reading than in a standard e-learning course. In order to prepare the student for the learning material and its chronology, the teaser is shaped as a “mini cosmos” of the whole course, which is structured according to the phases in the actual planning process (**Relevance**). This is visualized in an overarching animation that reappears throughout the course and helps the learner categorize the content. The introduction conveys how the phases fit together, in addition to informing the student about how to proceed in each module, so as to prepare for the final.

The learner proceeds through a miniature version of the course in 1.5 minutes, is given a sense of predictability, and can portion and adjust expectations and efforts accordingly (**Confidence**).

### Attention

The course designs also utilize elements from the **Attention** category, where components to avoid boredom and stimulate excitement and curiosity are particularly important. Such tactics aim at nurturing student participation and engagement, making sure to apply a variation in how multimedia are used and the kind of interactivity that is applied.



Figure 7. UCS - Intro of the Captain

The USC incorporates several examples from the Attention subcategories. In order to stimulate the sense of belonging, maintain the excitement of serving on submarines and the curiosity of what's to come, an actor is used to play the role of a submarine captain (fig 7). Early on he tells the students they are the chosen ones: only 100 people get to serve on Norwegian submarine and he expects everyone's best effort. Before they are allowed onboard, they have to show that they can solve some initial tasks. These types of challenges follow the learning content throughout the course, and the purpose is to avoid boredom and foster excitement and curiosity. Another means for stimulation is to present the learner with the Norwegian submarine history and use visual representations of the submarine. For instance, by advancing in the course, the learner can actively navigate through the submarine in an innovative

3D environment, and underway he/she encounters different types of interactivity and has to solve different tasks.

Another Attention subcategory is humor. Used with caution, humor invites the learner to use a different part of his/her mindset and renders the learning material less overwhelming, as well as putting it into another context. A particularly instructive example is found in BID and its characters. The story has two protagonists, Emma and Frank, and their interaction plays an important role in showing the connection between theory and practice. The progression in the story depends on how the students solve certain tasks, and he/or she is the enabler for Emma and Frank's success. At times, however, the theoretical content is complicated, and explosives are a very serious matter. In order to give the students some relief or breathing space, Frank is developed as a partly humorous "newbie" but also a likable, human character. He makes mistakes and acts clumsy, but still manages to complete the tasks he is given (fig 8). Through Frank the students are told that it is OK to make (certain) mistakes and that demolition is a learning process. They have a character to relate to, and occasionally they are even allowed to give a smile. This serves to foster their self-efficacy.



**Figure 8. BID, a character the students can relate to**

Variability is an objective and important constituent in all the courses. The instructional material in the OP course, however, calls for a particularly determined use of variation. As a large portion of the course consists of learning the basic content in the handbook – that is reading text – the instructional format has to apply means besides textual content. The concept was adapted to this challenge and combines interactive tasks and animations with blocks of film footage. We interviewed personnel involved in the planning process and shot at an actual defense exercise (Noble Ledger, 2014). These films are strategically portioned out in the course and function as a both "treat" and a different kind of stimuli that requires the student to combine a different set of senses and thought processes.

## Relevance

Making the learning useful and showing how the instructional material is applicable outside the learning situation are key components in the ARCS-V model. The courses reviewed are all directed at preparing or improving the learner's skills and knowledge for their current and future job prospects, requiring motivational design tactics that comply with Keller's call for instructors that build bridges between the content and the learner's wants or needs (Keller, 2010, p48).



**Figure 9. Interview with a Battalion commander**

As already discussed, the film footage from an actual operational planning process is included for variation. Another intention or effect, however, is to show why and how the textual content in the handbook plays out in real events. By including footage from the plan process "in action" during the Noble Ledger, the learner is explicitly shown (rather than told) the worth of the handbook in an actual operation. Also, by interviewing people from Brigade North, (fig. 9) the learning material is translated into experience and its relevance is substantiated by real examples rather than theoretical ones.

Relating the content to the learner's existing skills is another subcategory in the ARCS-V model. In the PBP course this is solved by way of differentiation, combining the learner's experience with need matching.



While the e-learning course covers the basic knowledge and components of the planning process, there is a lot of content from the handbook that is not included. For learners that are new to the planning process and have no existing experience grasping the basic concepts and tasks might be enough. But they may also be motivated to learn more and continue exploring the field on their own. This is especially relevant for advanced learners that either take the course to brush up their knowledge or has already studied or practiced the field. In order to differentiate and give the students the opportunity to take responsibility, make achievements on their own and influence their own learning, the design includes references and instructions for further reading and how to use the handbook.

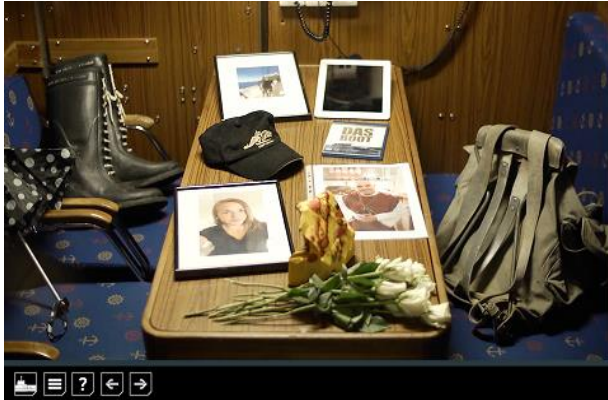


Figure 10. UCS, Addressing tacit knowledge

Giving the learner something that can be used immediately is another facet of the **Relevance** category. The submarine course addresses some of the tacit knowledge from the submarine service, normally not covered in the traditional class room course. By including a set of curious dos and don'ts the course aims to provide the learner something of worth they can start to use right away. At one point in the course, for instance, the learner is told why you are not allowed to whistle onboard the sub. Another example is a task where he/she has to choose which things the crew are not allowed to bring with them onboard (fig. 10). These are not rules regulated in the "official" course. Rather, these are traditions based on history and superstition. This type of information is directly useable the next time they are onboard one of the submarines.



Figure 11. BID, Instructional film

The most pertinent and explicit example of relevance is where the learner achieves something more than reaching "completion" on the progress bar or having the course ticked off as completed in their records. The BID course serves as an instructive example, as it is the first step of getting certified for military demolition (Military Demolition class 1a). First, the student has to achieve the general knowledge and pass the e-learning course. A student will not be allowed to advance to the practical part of the course until the e-learning course is successfully completed. The course contains valuable tasks, animations, instructional films (fig. 11) and photo material that allow the learners to interact with the demolition setting and preparing themselves. By informing the learner about the relevance of the course for the steps ahead, he/she is giving the information and opportunity to allocate efforts and attention according to future goals and needs.

## Confidence

Confidence and the subcategories "learning requirements" and "expectations" are closely related to the learner's ability to see the relevance of instructional material from a goal-oriented perspective. This part of the model, however, seems to be more directed towards how the design can help the learner to feel competent and believe that he/she is able to accomplish the tasks necessary to achieve the goals or relevance the course presents. That is, to be able to solve tasks and problems in his/her work setting. Generally speaking, the tasks or challenges in the courses in question are developed at an appropriate level of difficulty, adjusted to knowledge already acquired earlier in the course. In order to reduce the probability of failures that could reduce the learner's self-efficacy, the tasks are kept at a basic level without any really serious consequences if the learners fail.

The ULA submarine course exemplifies general enhancements and reinforcements that build confidence. Underway in the submarine e-learning course the learners are met with different types of tasks and tests. After successfully

solving these tasks, they are congratulated by the submarine Captain, telling them that they are doing great. This move aims at nurturing their own belief that they are able to acquire all the new information and learn what they are supposed to learn. A more explicit example is found in the beginning of the course, where the learner is asked to locate the different sections in the sub. Accomplishing this task gives the learner knowledge to find the different compartments in tasks to come, and finally, when he/she actually comes onboard (fig 12).

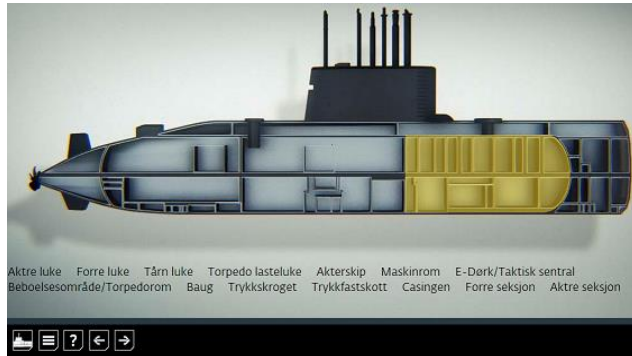


Figure 12. UCS, locating compartments

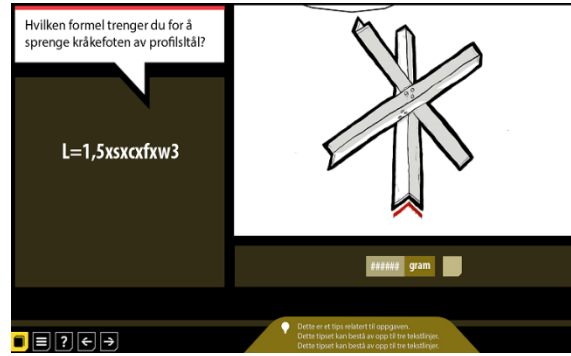


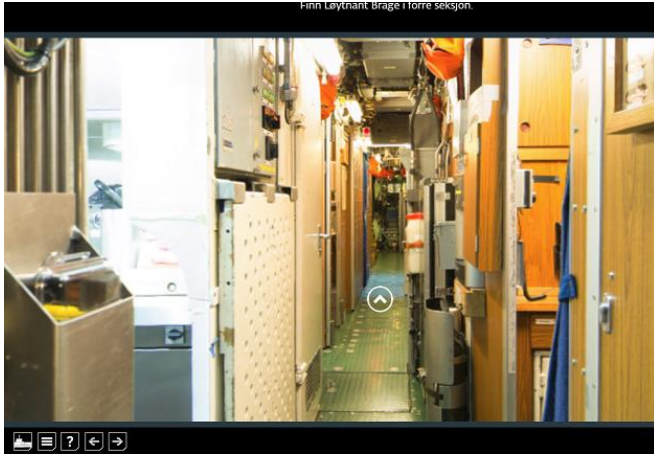
Figure 13. BID, basic theory

The BID course also serves as a good example to show the way in which the activities' level of difficulty increase, challenging the learner but at the same time reinforce self-confidence and show how the newly acquired knowledge is used to solve future tasks. For instance, in order to be able to calculate the right amount of explosives used in certain situations, the learner has to learn the basics about the different kinds of explosives, their characteristics and how to use the calculation form. Before being challenged to do the actual calculations (fig 13), the students go through explaining animations, instruction films and easier tasks that in sum enable them to complete the calculation on their own. Thus, before the learner can do this in the operational environment, they have to pass all these steps in the e-learning course.

### Satisfaction

The Satisfaction Category in Keller's model covers elements that give the learner a sense of fulfillment and a continued motivation to learn. The key in this category is consequences, whether natural, positive or fair. When developing our courses we always consider ways in which the students can apply what they learn and how feedback should be provided. The effects of consequences are influenced by both intrinsic and extrinsic elements and include the notion of being treated fairly and avoiding negative influence, expected or surprise rewards and other positive outcomes.

Continuing with the preceding examples from BID (fig 13), the task design for calculating explosives is meant to give the student a semi real context, where there are some consequences, but still not as severe as they would be in reality. Solving the tasks, however, is necessary to proceed. When the students are asked to calculate the amount of explosives, they can spend as much time required and try as many times as they need, and the feedback is never negative. Rather, they are given hints as to what they might have forgotten and suggestions for possible solutions. Also, Emma and Frank will not succeed with their mission until the students have completed all the necessary steps. Thus, progression in the story is dependent on the student action and can also be seen as a reward and a preview of what is to come.



**Figure 14.** UCS, Surprise permission of free

The Satisfaction Category in Keller's model covers elements that give the learner a sense of fulfilment and a continued motivation to learn. These effects are influenced by both intrinsic and extrinsic elements and include the notion of being treated fairly and avoiding negative influence, expected or surprised rewards and other positive outcomes. Similarly, the tasks in the UCS course are challenging but none of them have severe outcomes. Instead they are met with positive outcomes in terms of feedback from the Captain, solving tasks and getting rewards, like the permission to navigate in the sub at their own pace and likening, after passing the first chapter test.

### **Volition**

The new and fifth category in the ARCS-V model is volition and is focused on maintaining the learner's strong intentions of completing the course, take actions and self-regulate. The elements and motivational tactics suited for this category can be derived from the four main categories in the original model. It may be argued that intriguing the students and keeping them curious (**Attention**) will influence their strong intentions and thus correlates with the **Volition** category. However an example of how students can self-regulate is found in the submarine course where the learners to some degree can decide their own pace and path. They are allowed to repeat learning elements, retake modules if they want to, retake tests and spend additional time familiarizing themselves with the submarine in the 3D environment (fig. 14).

Self-regulation is also an important part of the BID and OP course. While both courses apply a structure and chronology, the students can choose and are encouraged to repeat learning elements or explore on their own.

### **SUMMARY**

We choose the ARCS-V model as a foundation for our efforts to have a systematic approach to motivational design in e-learning. In our opinion the ARCS-V model relevance is well documented and captures many of categories and elements found in other motivational theories as well. Implementation of the ARCS-V model, together with the TNA, for each of the three e-learning courses in the planning and development of suitable motivational strategies has proven very effective within the NoDUC.

### **THE WAY AHEAD**

Based on the motivational design in the three courses – the examples shown here and other motivational strategies in the courses – NoDUC and Transform AS will, in 2016, conduct a series of trials to track and document how the implementation of specific motivational tactics affect the learners' motivation in the beginning of, during and after an e-learning course. One or more of the presented e-learning courses will be to elaborate preliminary findings in this paper. The intentions are to document and discuss and document the findings in a second paper next year.

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