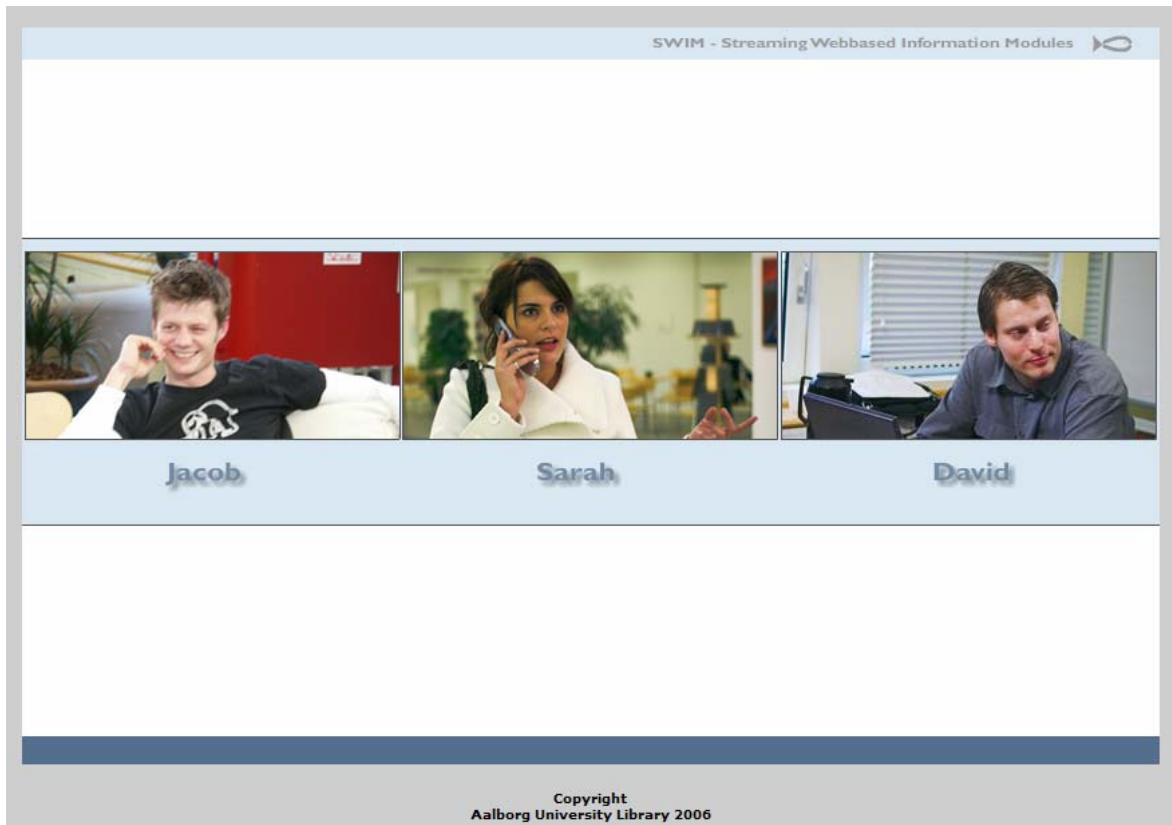


SWIM2 English version

the concept



The SWIM2 concept

– A video-based role-playing game/social simulator, English version

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Reading instructions

The purpose of this document is to give a brief introduction to, an overall view of, the ideas and thoughts that form the basis of the development of SWIM2 – English version. It contains a description of the purpose of SWIM2, its theoretical foundation, its basic structure and narrative elements.

The SWIM2 role-playing game is part of the larger Learning Objects Web project (working title) sponsored by Denmark's Electronic Research Library. The purpose of Learning Objects Web is "*...first and foremost to produce an international version of SWIM in order to reach more users. Secondly, we intend to develop a web application that can be used by students for managing research papers and projects and integrate the information search process in a phase oriented model managed by milestones*". (www.learningobjectsweb.dk 1 December 2005)

SWIM2 is based on experiences with the development, implementation and use of the original SWIM role-playing game, which is only available in Danish. The most important changes that have taken place in terms of developing SWIM2 are described in appendix 1. Thus SWIM2 is not an English version of SWIM1, but the result of an independent development project.

SWIM2's primary target group is students. In this document we will use the term "student" when referring to the target group, whose skills we wish to develop, while we use the term "player" when referring to the actual interaction in the course of the game.

This document will not deal with the other part of Learning Objects Web, which concerns a pedagogically arranged project management tool. This will be described in separate documents later on.

1.0 The purpose of SWIM2

The purpose of SWIM2 is to develop the student's information literacy skills. When using the programme, the student will develop methods and tools that can be applied in information

search processes specifically related to individual research papers, to studies in general, or in a broader sense pertaining to lifelong learning¹.

SWIM2 is intended to make the student reflect on previous, present and future information searches and information needs.

SWIM2 will make the student experience a clear connection between learning and information search.

This will take place via a video-based role-playing game in six acts, in which the player acts as the fourth member of a study group. Acts 1-5 each contains a conflict that requires the player's decision, whereas act 6 is an exam in which the player receives constructive criticism from the project advisor and the external examiner. The role-playing game is organised as a learning process focusing on reflection, consideration and critical thinking.

SWIM2 should be regarded as a contribution to the development of information literacy and not merely as a tutorial in information search. SWIM2 should also be regarded as the development of a tool/learning object that supports a constructivist view of learning in accordance with the transition that is taking place within library science at present away from a bibliographic paradigm and towards a process and learning oriented paradigm².

1.1 Target group

SWIM2's primary target group is first and second year students in higher education. However, experiences with SWIM1 have shown that the programme also can be used at a later stage in study programmes as well as at grammar-school/high school level.

Secondary target groups are the staff groups that are of importance to the students' academic development, such as teachers, project advisors and information specialists/librarians.

2.0 The use of SWIM2

The programme can be used as a stand alone product. However, it will be particularly useful as a learning object in a blended learning course in information search processes. A pedagogical manual for SWIM2 will be prepared. Until then we recommend that you look to the SWIM1 pedagogical manual for inspiration.

Danish version: <http://www.swiminfo.dk/pdf/paedagogik.pdf>

English version: <http://www.swiminfo.dk/pdf/pedagogy.pdf>

¹ The term "individual research paper" covers papers/assignments where the student him-/herself selects a topic, defines a problem area, carries out information search, selects theory and method, and analyses, evaluates, and draws conclusions. Individual research papers include project reports, dissertations, graduate level research papers, bachelor projects/theses etc. (*Den gode opgave*, 2005, p.19 ff).

² Kuhlthau [1993, 2004] characterizes the bibliographic paradigm as a source oriented teaching paradigm that primarily focuses on physical access to information and information retrieval.

3.0 The theoretical foundations of SWIM2

The development of SWIM2, and Learning Objects Web as a whole, is based on our perception and consideration of concepts such as learning, information literacy, information search process, learning styles and personality. The project is theoretically founded on the following theorists, whose work has been a major source of inspiration:

- Carol C. Kuhlthau's descriptions of learning as a process, the information search process, the uncertainty principle, roles of mediators and zones of intervention in *Seeking Meaning*, Libraries Unlimited, Inc. 2004.
- Jannica Heinström's descriptions of personality, learning styles, fast surfer, broad scanner and deep diver in *Fast Surfers, Broad Scanners and Deep Divers – Personality and Information-Seeking Behaviour*, Åbo Akademis Förlag/Åbo Akademi University Press, 2002.
- Lars Qvortrup's description of different forms of knowledge and learning in *Det lærende samfund – hyperkompleksitet og viden*, Gyldendal 2001.
- Claus Rosenstand's extension of Qvortrup's categories in *Kreation af narrative multimediesystemer*, Samfundslitteratur, 2002.
- Chris Argyris and Donald Schön's constructivist learning theory on "single- and double-loop learning" in *Organizational learning: a theory of action perspective*, Addison-Wesley, Reading MA, 1978.
- Lotte Rienecker and Peter Stray Jørgensen's description of the academic writing process and work on problem definitions in *Den gode opgave – håndbog i opgaveskrivning på videregående uddannelser*, 3. udgave Forlaget Samfundslitteratur, 2005.

3.1 Information search process and writing process

As it was the case in SWIM1, it is Kuhlthau's description of the information search process that forms the basis of our phase oriented recommendations. A presentation of Kuhlthau's model, and its incorporation in the SWIM2 concept, is described in appendix 2 and 3. The key point is Kuhlthau's emphasis on the information search process as part of an overall constructivist learning process that develops at both an intellectual and an emotional level.

In SWIM2 the information search process is presented as being far more closely intertwined with the academic writing process than was the case in SWIM1. This is partly to emphasize that both processes constitute important parts of the overall learning process, and partly to relate information search to everyday student life. In *Den gode opgave*, Rienecker and Stray Jørgensen describe a writing process in which broad literature search and reading constitute one phase in the process, whereas targeted literature search constitutes a later phase ("Den gode opgave", p. 85). A general view of how Kuhlthau's information search process and

Rienecker and Stray Jørgensen's description of the academic writing process is combined in SWIM2 is presented in appendix 3.

3.2 Uncertainty principle – roles of mediators – zones of intervention

“Uncertainty” is a cognitive state of mind that often characterises the early phases of the information search process, where the student does not know what to search for, or where and how to search³. That is, he/she lacks clarity. This will be expressed emotionally through e.g. frustration regarding “has anyone written anything about this subject?”, “how do I proceed?”, and lack of overview. Thus, Kuhlthau's “uncertainty principle” is an important key to the progress of the information search process, because the student is seeking certainty, seeking meaning (*Seeking meaning*, 2004, p. 89 ff).

In SWIM2, the movement away from “uncertainty” and towards “clarity”, and thus a larger degree of “certainty”, is used dramaturgically to make the story progress, and as the basis of the counselling sessions that the study group in the game has with the library's information specialist, and their own project advisor, in certain phases of the information search process. Hereby, the programme illustrates the connection between Kuhlthau's concepts of “uncertainty principle”, “roles of mediators” and “zones of intervention”.

Kuhlthau divides mediators into two groups; formal and informal. Among the formal mediators are professors/teachers and information specialists/librarians, whereas informal mediators are e.g. family, friends, colleagues and subject experts. There are two formal mediators in SWIM2 – a library information specialist and a university teacher (project advisor). The parts they play in the programme are based on Kuhlthau's description of the formal mediator as “counsellor” (*Seeking meaning*, 2004, p. 107 ff). This adds emphasis to the process and learning oriented paradigm that SWIM2 represents.

The counsellor is aware of the uncertainty principle. Information search is considered to be more of a creative process of construction than a search for the right answers. Ideally, the student will be coached through the dynamic process of seeking meaning. Throughout the process there is a continuous evaluation of sources, in terms of type of material and degree of difficulty, based on the student's experience and knowledge at a given time. The problem/subject may be of a general nature, but the student adds his/her individual perspective. Thus, the counselling process itself becomes individual and unique. Student and counsellor work out a strategy that gradually develops as the student learns and acquires more knowledge.

There is not one “right” path to follow. The path of information search is determined by the student's information needs.

³ See Appendix 2 for a general view of the phases.

“Zones of intervention” concerns *when* and *how* the mediator should intervene (*Seeking meaning*, 2004, p. 127 ff). The process oriented paradigm is based on the “uncertainty principle” that requires an overall view of searching and use of information determined by the student’s needs. The “uncertainty principle” involves new approaches to intervention. Kuhlthau defines “zones of intervention” as:

”That area in which an information user can do with advice and assistance what he or she cannot do alone or can do only with great difficulty”. (*Seeking Meaning*, 2004, p. 129).

With regard to the role of the mediator, Kuhlthau divides the interventions into five different zones – Z1 to Z5. The information specialist and the project advisor in SWIM2 are both examples of a Z5 intervention. I.e. a process oriented intervention at counsellor level (*Seeking meaning*, 2004, p. 131).

3.3 Learning

The possibility of identification with the characters, situations and problems in SWIM2 is important in our constructivist approach to learning, which describes learning as an active individual process constructed on the basis of the individual’s knowledge and experience. (*Seeking Meaning*, p. 15). Identification will motivate the student’s reflection, challenge his/her existing knowledge, and form the basis of the construction of new knowledge and development of existing information literacy skills.

The narrative of SWIM2 seeks to establish a sphere of learning by focusing on the student’s work process instead of on the library’s resources – i.e. focusing on different parts of the individual research process and thus also of the information search process. In this sphere of learning, the student will reflect on the problems experienced in connection with writing papers and searching for information, and relate them to the information search strategies represented by the three characters in the narrative.

Through the three fellow students in the study group, whom in a Quvortrupian sense represent different forms of learning – i.e. learning of the 1st, 2nd, and 3rd order - (*Det lærende samfund*, p. 135), we wish to influence the player’s construction of knowledge in relation to information search. This will take place when the player considers, and eventually acts upon, the different choices in the course of the role-playing game, including the final exam act where the three fellow students explain what they have learned. Furthermore, once the player has completed the game, he/she will be directed to other sources of helpful information in Learning Objects Web.

Through the choices that the player has to consider in the course of the game, and the final exam round-up, we wish to create room for reflection that appeals to what Argyris and Schön describe as “double-loop learning” – i.e. metareflection. Metareflection constitutes an important element in our perception of information literacy.

3.4 Information literacy

In order to grasp the purpose of SWIM2, and its pedagogical vision, it is important to consider the term information literacy. SWIM2 is not constructed on the basis of a particular information literacy standard, like the ones that have been formulated and applied in certain parts of the U.S., Australia and New Zealand, but is closely related to the constructivist understanding of learning and action in the information search process that have been described by Kuhlthau. Still, the perception of information literacy in SWIM2 draws on a number of elements that are included in the standard definitions.

We perceive information literacy as the ability to evaluate, select and/or act in a situation where you need to find or use that which makes a difference in solving an information problem. Information literacy is the individual's ability to move between levels of action and reflection (meta-level) in the understanding and handling of his/her information need, and the ability to use the result in the process that lies ahead. What one person considers being information may not necessarily be information in the eyes of somebody else - i.e. information is interpreted data. Whatever meaning is being created eventually depends on the individual's construction of knowledge.

Ideally, the development of information literacy takes place in the interplay between educational institution, library and the individual user. Thus, the development of information literacy is not bound up with a particular scientific discipline or viewed as something that belongs exclusively to the libraries.

4.0 The structure and narrative elements in SWIM2

Like SWIM1, SWIM2 is constructed as a role-playing game in which the player must use his/her present information literacy skills to rise to a higher level of information literacy. The original idea has been to develop a programme based on the information problems that students experience in connection with writing research papers, and to let the story take place in a study group – a common form of studying which offers certain dramaturgical possibilities.

The programme's point of departure is the student's work process, and the narrative is structured around the phases that typically characterise the progress of individual research paper work. In SWIM2, the research paper is a project report. The work process of the study group is intended to be as realistic as possible. Thus, the narrative is influenced by each group member's personality, behaviour, priorities, study approach and attitude towards life in general.

For the sake of progress and action, the narrative of SWIM2 is structured around five main conflicts that occur in a linear sequence of events portraying the phases of research paper work from beginning to end. The linear sequence of events consists of five acts followed by a concluding exam act.

4.1 The structure of the role-playing game

SWIM2 begins with an introduction to the role-playing game and an optional presentation of the three other members of the study group: David, Sarah and Jacob. Afterwards, the player(s) is ready to begin the game⁴.

- Each act opens with a video sequence that briefly introduces the present situation.
- Then David, Sarah and Jacob discuss their different strategies for solving a conflict in connection with their information search.
- The player (the fourth member of the group) must then decide which strategy to support.
- Then follows a number of sequences in which the group considers the situation.
- The player must then decide whether he/she will hold on to his/her original choice or change strategy.
- Then follows a number of sequences in which the group considers the situation.
- Finally, the player must decide whether he/she will hold on to his/her first and/or second choice or change strategy.
- The final choice of each act will influence the player's final score in the game. In each act one of the characters represent what is considered to be the most appropriate strategy in the given phase of the work process.

The accumulated score forms the basis of the final act, the exam. Each of the five main conflicts deals with the question of how to solve the group's present need for information. In acts 1, 4 and 5 the player is informed of the need in question, whereas acts 2 and 3 contain an extra conflict, in which the player must decide/identify the nature of the present need before moving on to the main conflict. This extra conflict is of no consequence to the player's final score, but serves the purpose of introducing the formal mediators: the information specialist in act 2 and the project advisor in act 3.

In the exam act, the group receives their grade (A, B or D) along with constructive criticism from the project advisor and the external examiner. After the exam, the player leaves the game and is introduced to a number of options in Learning Objects Web.

The connection between phases, acts, conflicts, strategies and score is presented in appendix 3.

4.2 Phases, acts and conflicts

Using Kuhlthau's model, we have divided the information search process and the research paper work process into five phases with headings that express what we consider to be the main need of each phase. The five phases are followed by a final sixth phase of critical assessment, which constitutes the final stage of the overall learning process.

⁴ At Aalborg University Library we usually let the students play SWIM1 in groups of 2-3 persons. Together the group constitutes the fourth member of the study group in SWIM1.

1. Phase 1 – creative idea development
2. Phase 2 – creative pre-focus exploration
3. Phase 3 – critical focusing
4. Phase 4 – critical, analytical research
5. Phase 5 – conclusion, reflection and broader perspective
6. Phase 6 – exam and critical assessment

Phase 1 – Creative idea development

This phase is all about beginning the creative process, about getting some ideas on the table and work with them. It's about getting started on the task at hand. At this point, you need to pursue your ideas. These ideas will help you identify what type of information to search for in phase 2 and to decide on pursuing a useful direction in order to work with something exciting, engaging and theoretically valid.

In terms of information search strategy, we recommend that you begin with the group's present sum of knowledge of the field. You must identify what you already know and use the interaction for generating and developing more ideas.

Act 1 – Group study room

On the basis of common interests, four students (the three characters + the player) have decided to form a study group and write a project report⁵. This is their first meeting in which they must take the initial steps towards deciding upon a topic. The atmosphere is energetic and full of optimism. They agree that they need to develop ideas, but the conflict occurs when they disagree on how to do it.

Thus, the conflict is all about deciding upon a method for identifying and developing ideas – i.e. creative idea development.

Phase 2 – Creative pre-focus exploration

The purpose of phase 2 is to work towards a general view that will help you establish clarity regarding the project's direction. It is a creative phase. However, not creative in the sense that you should come up with creative or clever solutions to your information needs. The creative element lies in what Kuhlthau describes as an “invitational” mood or approach to ideas and possible connections within the fields that you want to research. Thus, you explore the surface of the different thoughts and ideas that the group has come up with so far, in order to establish a focus and decide which ideas should be included and which should be left out of the project. The strategy is to establish a general view of the relevant fields of knowledge and possible ways of presenting the problems. It is not until later, in phase 4, that you explore in depth.

We recommend that you search for information that is accessible, easily understood, that gives you overview and is inspiring, as the goal is to establish a general view of the content of

⁵ In SWIM2, the project report serves as example of the “individual research paper”.

your ideas and whatever problems they present. This type of information is often available in e.g. reference works, mass media and the Internet. The sources may not always be scientific and will not necessarily be included in the project. They are intended as inspiration, as something that will provide you with an overview and form the basis of later selection when you move on to phase 3.

Act 2 – Group study room and the library

In the wake of their immediate excitement about their initial selection of ideas, the group has come to a bit of a standstill. Optimism is replaced by mounting frustration regarding how to proceed with the project. How are they going to work with their ideas? They feel frustrated, partly because they are uncertain of what to do next and partly because of their own uncertainty regarding the possible fields of knowledge and problems contained in their ideas. Their ideas have brought up so many questions that it has become difficult to assess how to go about working with them.

Uncertain of what to do next, the group has contacted an information specialist at the library, as they feel quite confident that the library can offer plenty of relevant material. During the meeting with the information specialist, the group discusses the best way to fulfil their present information need. Once again they disagree.

1st conflict: Before they can find out how to go about searching for information, the group has to identify their present information need. In order to understand their present need, they have to have some sort of understanding of the phase they are in. The mounting disagreement can be detected in the meeting with the information specialist.

2nd conflict: Once the group realizes that they have to explore the surface of their ideas in order to establish a general view, they need to find out how to go about doing that i.e. where should they look for this type of information.

Phase 3 – Critical focusing

In this phase you must use the general view that you have just established, partly through clarifying terms within the particular field(s) of knowledge, and partly through creative pre-focus exploration of interesting problem areas. You are about to decide the focus of your project and define a problem and a *preliminary* problem definition. At this point, your problem definition has to be preliminary as the insight/construction of knowledge in phase 4 is bound to influence the final problem definition.

Thus, towards the end of phase 3 you are able to describe your goal and define your focus. You have acquired “a sense of direction” – i.e. you know which way to go. Precisely because you have acquired a sense of direction, you are also very much aware of your information needs – i.e. what you need to know more about.

In relation to information search, we recommend that you work with the information you have gathered in connection with establishing your focus, and that you spend time preparing your upcoming search for in depth information. You prepare your search through discussions about direction, problem areas, and relevant contexts, and, on the basis of these discussions, you work out a list of keywords. The list will include central issues, key terms, persons etc. along with synonyms and alternative terms. The list should be divided into broad and narrow terms that consequently can be used as search terms, separately or in combination, in the upcoming information search.

Act 3 – Project advisor’s office and group study room

The project group has made a creative exploration of certain ideas and clarified a number of terms, and now possesses a general view of their ideas. They are about to come up with a preliminary problem definition. They have arranged a meeting with their project advisor to discuss certain issues and get some advice regarding the academic/scientific process. Their sense of frustration has vanished concurrently with the acquisition of overview and surface insight. In other words, their uncertainty has been replaced by certainty and insight.

1st conflict: The first conflict concerns the group members’ perception of their present need. It is our intention to show that focusing is about selecting a problem on the basis of the ideas and knowledge that you have obtained through the first two phases.

2nd conflict: The group has worked out a preliminary problem definition. The second conflict is about focusing in relation to their present information need. As a result of the meeting with their project advisor they have managed to narrow down the problem. Now, they are moving within much narrower bounds and are about to start searching for information to document their idea. The conflict is about whether or not they should find some keywords – and if so, where they should look for them! (The keywords are intended as preparation for the information search in phase 4 – the critical, analytical research).

Phase 4 – Critical, analytical research

The purpose of this phase is to thoroughly research your problem on the basis of scientific information i.e. insight into the fields of knowledge. You work with data that must be analysed and researched critically, and you document your research in drafts or working papers, which in the course of phase 4 are turned into final chapters. This phase usually turns out to be the most heavy and demanding phase of the writing process.

In this phase you know where you are heading. You are aware of your information needs in the light of your pre-focus exploration in phase 2 and your work with the material in phase 3. The previous feeling of uncertainty has now been replaced by a feeling of clarity.

We recommend that you spend time selecting relevant scientific information resources for your in depth search information. You should use your list of keywords and terms, structured

and in combination, and conduct a structured search⁶ on different contexts and, on the basis of this, try to assess which material should be included as principal information.

Act 4 – The library

Since the meeting with their project advisor in phase 3, the group has primarily worked towards a clarification of the project's direction. They have been focusing and structuring their project and have arrived at a preliminary problem definition which is now their primary tool of management.

They feel confident, they know where the project is heading, and they are aware of their information needs. They have prepared their upcoming search for in depth information by extracting the most important keywords from group discussions regarding the problems and content of the project. The keywords have been structured and combined on a list in preparation for their information search.

The conflict arises because they disagree on how to approach the in depth search for information.

Phase 5 – Conclusion, reflection and broader perspective

The purpose of phase 5 is to place the project's conclusion(s) in a broader perspective, thereby displaying your overall knowledge of the field as well as your ability to place documented research in relevant new contexts (e.g. what sort of problems follow in the wake of your conclusions?). Putting matters into perspective may also serve as an excellent starting point for discussions at an oral examination.

The result should be predictions, connections, recommended courses of action, and/or new areas of research presented in a separate paragraph or chapter. Putting matters into perspective may often lead to new questions that resemble the outline of a new problem definition.

With regard to information search, we recommend that you use material that you have had to leave out at an earlier point – i.e. begin by going through the knowledge you have constructed and the material you already have in your possession. The strategy is similar to the strategy in phase 1, except that your knowledge and insight into the problem is far more extensive. You may also choose to include “introductory material” that suits the level and amount of detailing that your perspective requires.

Act 5 – Group study room

The writing process is drawing to a close. The group is sitting in the group study room applying the finishing touches to the project report. There is an expressed sense of relief as they agree that all they lack is putting matters into perspective. The purpose of act 5 is to make the player reflect on choice of relevant method regarding information search at this

⁶ Being creative and able to adapt to the structure and content of the databases are parts of what it means to be good at searching for information.

particular point in time. Furthermore, through the other group members' discussion about putting matters into perspective, the player will be informed of the nature and purpose of the task at hand.

The conflict arises because they disagree on how to search for information that may add perspective to their project.

Phase 6 – The exam and critical assessment

The purpose of this phase is to sum up what you have learned during the process on the basis of the choices that you have made. The recommended information search strategy will emerge partly from constructive criticism expressed by the project advisor and external examiner and partly from the group's own reflection on what they think they have learned. Thus, phase 6 addresses the player's construction of knowledge or learning in relation to the entire information search process through retrospect and overview. At the same time, phase 6 looks ahead in terms of encouraging the player to reflect on the consequences of his/her choices and on what he/she may do differently when facing future information needs.

Act 6 – Examination room

The examination is over. The group members are waiting outside the examination room for their grade and some constructive criticism on their work. They re-enter the room and receive their grade and constructive criticism from the project advisor and the external examiner while looking more or less pleased. The group comments on the criticism as they go along, thereby conveying what they have learned with regard to their information search process.

There are no conflicts or choices in act 6.

Act 6 is followed by an outro in which the player may view his/her answers and watch the feedback videos from the exam once more. It is our intention that the outro should lead the player to the other parts of Learning Objects Web, where he/she will find tools for controlling the information search process in relation to individual research papers or the learning process as such.

4.3 SWIM2 character profiles – David, Sarah and Jacob

The three students in SWIM2 are constructed as complex characters with psychological, social and academic profiles, each of which represents a strategy for learning and information search.

The combination of character profiles and information search profiles are inspired by Jannica Heinström's work on describing "NEO-FFI profiles" and her descriptions of the information search profiles Fast Surfer, Broad Scanner and Deep Diver (*Fast Surfers, Broad Scanners and Deep Divers – Personality and Informations-Seeking Behaviour*, 2002).

The Neo ffi-model (NEO Five-Factor Inventory) is a personality test based on the more extensive and time-consuming NEO PI-R-model (NEO Personality Inventory). The personality test measures on the basis of five fundamental character traits of a normal personality: Extraversion, neuroticism, openness to experience, agreeableness and conscientiousness. Each trait varies between a high and a low level of expression ⁷.

Heinström considers information search and learning process to be interrelated, and her examination shows that students' efforts with regard to information search may influence their learning process one way or the other. Heinström states that one may profit from applying different strategies (fast surfer, broad scanner and deep diver) at different stages (phases) of the writing process, as recommended in SWIM2.

The learning potential of the three fellow students in SWIM2 is developed on the basis of Lars Qvortrup's descriptions of different forms of learning and knowledge (*Det lærende samfund*, 2001), and the constructivist learning theory on "single- and double-loop learning" presented by Argyris and Schön (*On organizational learning*, 1978).

In Qvortrup's schematics forms of knowledge and learning are divided into four categories to illustrate how change can take place in a hypercomplex society. Here, *forms of knowledge* show a connection between level of knowledge, type of stimulation and result which spans the acquisition of qualifications at the level of the 1st order, the development of competencies at the level of the 2nd order, and the exercise of creativity at the level of the 3rd order, in order to create culture at the level of the 4th order (*Det lærende samfund*, p. 107). Qvortrup's schematics on *forms of learning* are divided into three orders of learning and a fourth category which he terms "preconditions" (*Det lærende samfund*, p. 135). Claus Rosenstand extends Qvortrup's schematics on forms of knowledge and learning and adds more categories – e.g. basic type of "situation", and "focus" in terms of solving the situation in question (*Kreation af narrative multimediesystemer*, 2002, p. 232 ff). This is used in SWIM2 to stress the strong and weak sides of the characters, and to give them a reflexive profile. Qvortrup himself describes how learning of the 3rd order can be juxtaposed with Argyris' and Schön's concept "double-loop learning", which represents the capacity for metareflection and new ways of learning (*Det lærende samfund*, p. 135).

The research of Chris Argyris and Donald Schön concerns organisational and individual learning and their concepts of "single-loop" and "double-loop learning" are fundamental to the understanding of learning. "Single-loop learning" is basically about the individual choosing a known, routine-based approach to problem-solving. The purpose of single-loop learning is to do more of what you are already doing. Single-loop learning is the type of learning that occurs when an error is detected and corrected in a manner which enables you to continue doing what you have always done.

⁷Heinström, Jannica; *Fast Surfers, Broad Scanners and Deep Divers*, 2002, p. 108 ff.

“Double-loop learning”, on the other hand, addresses fundamental assumptions for the purpose of renewing or altering your actions. Thus, double-loop learning challenges the individual in everything that, through single-loop learning, has become routine and habits that you have long stopped considering. In double-loop learning the error or problem is detected, but instead of an automatic, routine-based reaction the individual begins to question the framing and learning systems that underlie his/her current actions – i.e. could there be other explanations for the occurrence of the error? Are we in fact producing the right product? Are we doing things the right way?

Below is a presentation of the character profiles of David, Sarah and Jacob based on personality, learning potential and information search profile. Thus, we have used the theories described in the above to add flesh and blood to three different character parts, each of which represents a dominant information search strategy. The point we wish to make is that the desirable information search strategy is a combination of the three. In each case, the percentages are proportional to a starting point of 100%.

Character profile 1 – “qualifications” – David

Personality

Character profile 1 is basically a somewhat nervous and shy sort of person. The character has low self-esteem which in many cases results in introverted and hesitant behaviour. Character profile 1 usually lets others take the lead in the beginning. Character profile 1 has a relatively conservative outlook, but is willing to listen to the ideas of others. Devotion to duty makes character profile 1 a very hard-working person, and has resulted in qualifications at a high level.

Learning potential

Qualifications 100%, competencies 60%, creativity 40%

The strength of character profile 1 is excellent qualifications accumulated through interest and hard work throughout the character’s educational background. Character profile 1 has a vast amount of factual knowledge and technical skills at his disposal. Character profile 1 is most comfortable finding solutions in situations where the problem is known and where he is familiar with the solution method – or gets it from someone else.

Compared to Chris Argyris and Donald Schön’s constructivist learning theory, character profile 1 masters single-loop learning – or learning of the first order.

Information search profile

Fast Surfer 50%, Broad Scanner 80%, Deep Diver 40%

The information search of character profile 1 is characterised by a combination of hard work and lack of overview. Character profile 1 uses vast amounts of information, and is good at

locating it, but has difficulty in grasping a problem area, because he finds it difficult to wait for the appearance of a problem that may qualify choice of literature and other information. Thus, character profile 1's suggestions regarding information search will gradually improve once the problem and solution method are known.

Character profile 2 – “competencies” – Sarah

Personality

Character profile 2 is an energetic and active person with high self-esteem and more personal power than most people. Character profile 2 thinks clearly and works methodically. This character profile is efficient and readily makes decisions in order to move on. Character profile 2 is of a highly competitive nature and may seem selfish and impatient at times. Character profile 2 is argumentative and direct in her communication with other people and – like character profile 1 – has a somewhat conservative and practical outlook.

Learning potential

Qualifications 60%, competencies 90%, creativity 50%

Character profile 2 is good at using different solution methods in situations where the problem is known, but the solution is unknown. Character profile 2 has overview and is able to reflect on a problem and, on the basis of that, select the right method for solving the identified problem. The competencies of character profile 2 have been acquired through the ability to reflect on matters, and the acquisition of knowledge is characterised by assimilation. The competencies of character profile 2 show that she is capable of learning to learn.

Character profile 2 masters both single-loop (one question – one answer) and double-loop learning (one question – many answers).

Information search profile

Fast surfer 60%, Broad Scanner 95%, Deep Diver 40%

Character profile 2 has a practical approach to information search – all types of information can be used. Character profile 2 has no prior quality demands regarding the material's scientific level, but mainly looks at: Can we use it? If so, how? Character profile 2 has no particular information search strategy. However, character profile 2 is systematic and thorough when selecting material, should she ever be forced into conducting the actual search herself!

Character profile 3 – “creativity” – Jacob

Personality

Character profile 3 can be described as a happy, positive and self-confident person. Character profile 3 is open to new impressions and listens to the ideas of others. Character profile 3 is easy-going and not particularly conscientious with regard to things he finds uninteresting. On the other hand, character profile 3 enjoys becoming deeply absorbed in material or subjects

that interest him. Once the project is beginning to take shape and become interesting his willing hands make light work and he begins to draw on the qualities that this character profile possesses.

Learning potential

Qualifications 50%, competencies 60%, creativity 100%

Character profile 3 prefers situations that require a problem-oriented approach, where both problem and solution method are unknown. Character profile 3 focuses on product and problem – not so much on the process. Character profile 3 is creative. He is capable of reflecting on problems in a manner that connects theory and practice in new ways. This means that character profile 3 is capable of finding new solution methods. In other words, character profile 3 is able to learn in new ways (metareflect).

Much of the knowledge and competencies that character profile 3 possesses have been acquired through creative adaptation to things he has found interesting and been absorbed in throughout his life. In some cases, character profile 3 is able to reason his way to connections that may fill out gaps in his knowledge (quantum leaps).

Character profile 3 is a master of double-loop learning. However, it should be noted that this character is not particularly good at single-loop learning. He finds routine tasks and “doing what you are accustomed to do” boring.

Information search profile

Fast Surfer 70%, Broad Scanner 50%, Deep Diver 90%

Character profile 3's approach to information search changes in the course of the project. In the beginning, character profile 3 is mainly a Fast Surfer, as his interest in the subject has not yet been awakened. Once his interest has been awakened, this character profile becomes absorbed and hence changes his approach to information search to Deep Diver. Character profile 3 prefers using key theorists within a particular field of knowledge and moves on from there – or simply thinks up the rest. The driving force of his information search strategy is intellectual reflection.

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