Using the Learning Cycle Model to Design Training for Oil Field Operators

Understanding and Working with Learning Styles

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1 Introduction

The purpose of this paper is to describe the process used to design a training session for a client based on the design system and the principles of the Learning Cycle presented in the course *Understanding and Working with Learning Styles* and described in the text *Revving Up Thinking and Learning: Course Design Guide* (Herasymowych & Senko, 2003). The purpose of the training session is to introduce a pipeline operations and maintenance manual to a group of operations and maintenance personnel employed by an oil company.

The client wants to ensure that the training session is practical as most of the participants will not be used to classroom based training as their jobs are primarily field-based. The objective of the training session is to incorporate the new manual into working practice. Traditionally new technical manuals like this have been introduced through a series of presentations with little or no active participation. This project presents an opportunity to me personally to design this session using the design system and the principles of the Learning Cycle to achieve better results and open the doors for this approach in the market.

The primary concept used in this assignment is the Course Design System Model, which is based on the Learning Cycle, described in detail in the next section. The design system model is explained in detail in Section 4.

The option I have chosen for this assignment is to design a new activity. Rather than design the entire training session, I have decided to focus on the design for one particular large concept, which is critical for the people attending the training session to understand and be able to apply at the end of the session. This concept is a pipeline decommissioning decision process which has recently been re-designed and is presented as a flow chart (see Figure 4.1 in Section 4).

2 The Learning Cycle

The Learning Cycle is comprised of four basic behaviours that people display when learning through solving problems (Herasymowych & Senko, 2003). Each of the four behaviours results from a specific learning orientation: Reflective, Theoretical, Practical and Active, and are described below:

- Reflective – gather and analyze data
- Theoretical – make sense by finding patterns and drawing conclusions
- Practical – make decisions and plan next steps
- Active – Take action on the plan

The first two learning orientations (Reflective and Theoretical) are associated with Reflection while the second two (Practical and Active) are associated with Action. A combination of preferences for each of the four associated learning orientations are used to describe a person's learning style profile.

David Perkins introduced a term called learnable intelligence, which is a combination of experiential intelligence (Action) and reflective intelligence (Reflection) (Herasymowych & Senko, 2003). When we approach learning using the learning cycle as a design tool, we can ensure that the four learning orientations are addressed and the two parts of the cycle (Action and Reflection) are covered to complete the cycle and increase learnable intelligence. This division between Action and Reflection is shown on Figure 3-1 in the following section.

Each learning orientation in the learning cycle leads to the next, creating a circular dynamic (Herasymowych & Senko, 2003). When the learning cycle operates it is actually repeating in a spiral pattern and each cycle is different, creating new knowledge as well as new and novel ways of thinking and learning with each cycle.

3 My Learning Style Profile

Figure 3.1 below shows my Learning Style Profile as determined by the Learning Style Questionnaire designed by Peter Honey and Alan Mumford (Herasymowych & Senko, 2003).
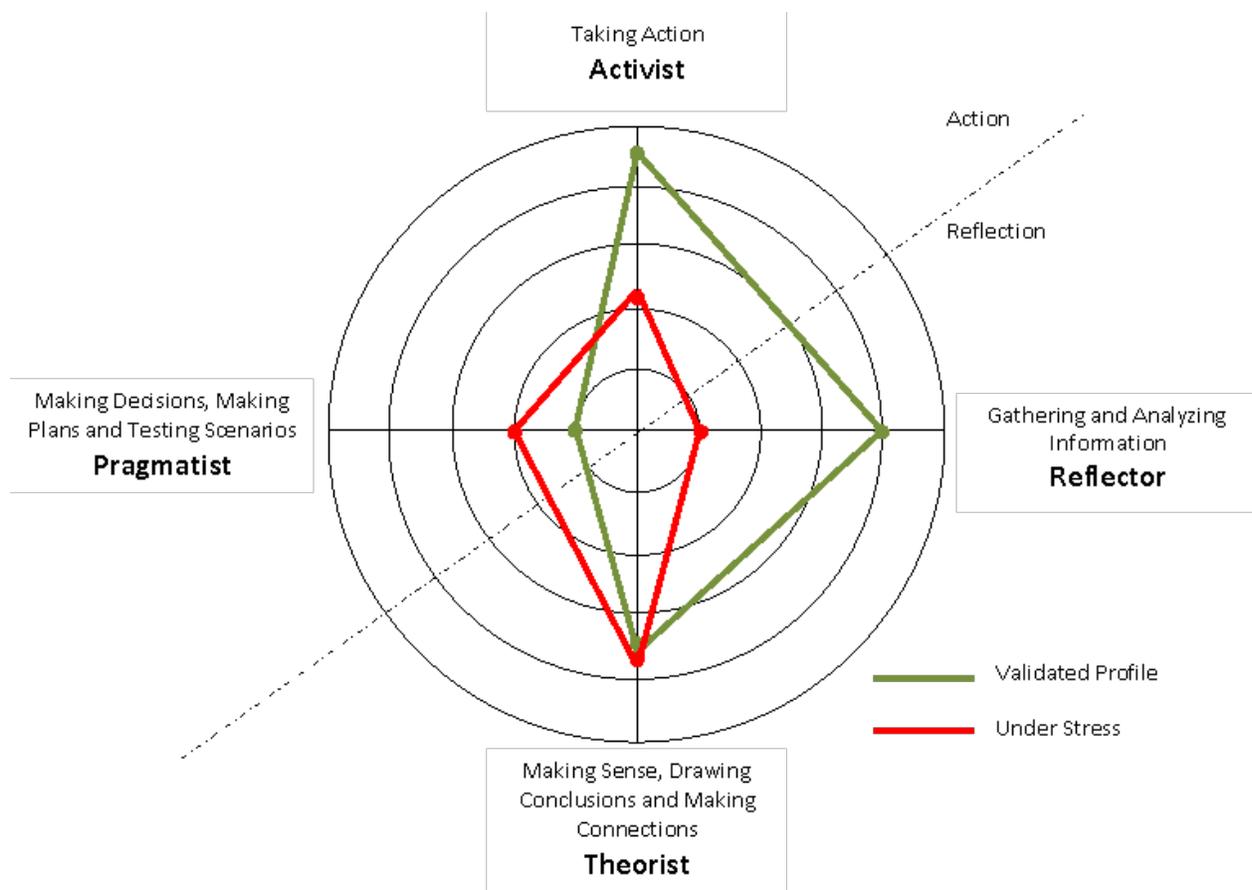

FIGURE 3-1 MY LEARNING STYLE PROFILE

The figure shows two profiles: a validated profile which took the original profile and adapted it based on a series of validation activities during the course, and a stress profile which was generated by answering the questions in the learning styles questionnaire based on how I behave under stress.

The validated profile shows that I have a:

- High score in the reflective orientation, meaning that I spend time gathering and analyzing information
- High score in the theoretical orientation, meaning that I spend time making sense, considering options and drawing conclusions
- Low score in the practical orientation, meaning that I do not spend much time planning and testing scenarios
- High score in the active orientation, meaning that I am willing to take action quickly and have faith that it will work out or that I will figure it out as I go along

My strongest learning orientation is active, which is displayed in my eternal faith that everything will work out and I am willing to try almost anything. This is tempered partially by my strength in the two reflective orientations (reflective and theoretical) where I do spend type synthesizing information and complex ideas into simple models and I do focus on listening and tolerating others' approaches.

The primary drawback for me due to being strong in the active orientation is not being able to slow down and sometimes not taking time to think things through. When I have any doubt, I do fall back and spend time reflecting but if I think I know the answer straight away it is difficult to slow me down. I also have trouble being open to perspectives that do not seem to be grounded in theory. My faith in things working out can also sometimes be a weakness for me when a more detailed plan is appropriate in a situation. It is often difficult for me to slow down long enough to plan things effectively. The most common excuse I use to shortcut the pragmatist style is believing that someone else's ideas will not work in my situation.

It is also interesting to note how my learning style profile has changed. The first time I did this questionnaire was approximately eight years ago, when I was a junior engineer at an oil company. At the time, the demands of my job required me to make decisions quickly and there was a large degree of planning involved. As a result, my learning style profile was much stronger in the pragmatist orientation and weaker in the reflective orientation. Now I am a self-employed consultant, I no longer spend my time at the edge of the organization having to make quick decisions. The nature of my work has allowed me to become less practically focused and more comfortable in a reflective orientation. I have more time to spend on reflection and theoretical activities and the nature of my work now demands that. The change may also reflect the level of stress I was under at the time as a result of my job requirements; my learning style profile at that time more closely resembled that of my profile under stress.

Also interesting is what happens to my profile under stress. I immediately become much more closed and focus on coming up with a plan, a list or a practical approach to a problem. When I am under stress I spend less time reflecting and am less comfortable acting. I feel like I need more time to reflect and ensure I understand what is going on in order to act but feel unable to take the time required for reflection. When I am under stress, I lose my faith that the practical side of the solution will just emerge if I focus on reflection and understanding the theoretical basis of the problem, and instead focus my efforts on the practical approach.

4 The Design System Model

The design system model is comprised of eight elements and tasks, two for each learning orientation. The design system is illustrated in the figure below showing the eight elements and (numbered 1 through 8) how they relate to the learning orientations (Herasymowych & Senko, 2003). The heavy solid line represents the division between Action and Reflection as discussed previously and also shown in Figure 3-1.
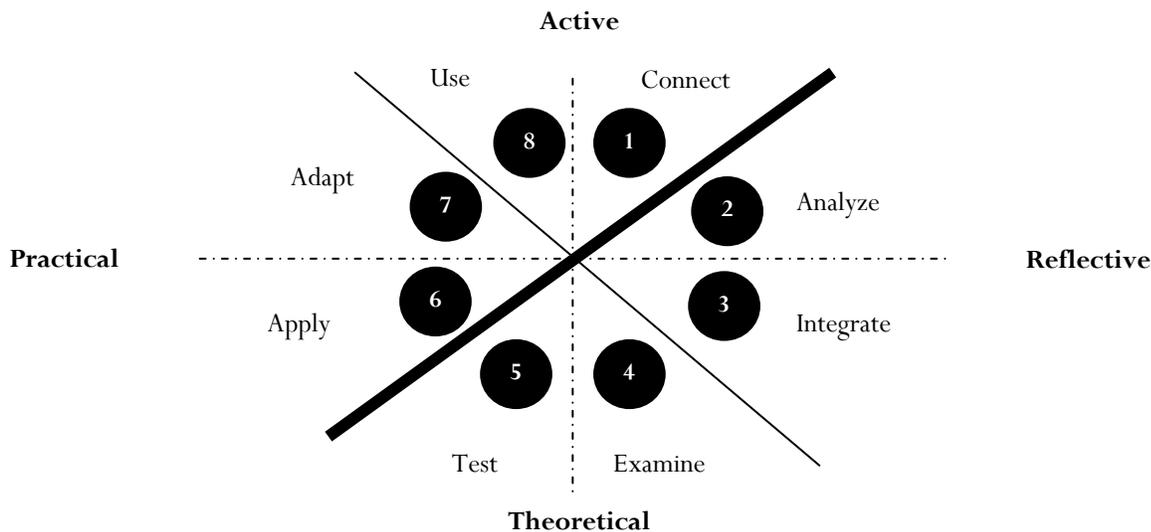
Active

Use   Connect

⑧   ①

Adapt   Analyze
         ⑦   ②

Practical – – – – – – – – – – – – – – – – Reflective

         ⑥   ③
Apply   Integrate
              ⑤   ④

Test   Examine

Theoretical

The model is used to visually represent where in the learning cycle a strategy for facilitation resides and to help design activities that progress through the learning cycle and incorporate multiple elements as appropriate.

In Hearsymowych & Senko's work, the model above is used to present a series of design patterns which can be used to help design an activity to cycle through the elements of the design system. Also included in their work are a series of design strategies and templates, which apply to elements of the design model. Thus the model can be used in conjunction with these strategies and templates to complete a detailed activity design as will be illustrated in the following sections.

4.1 Context of the Activity

The activity I am going to use the model to design is intended to introduce a pipeline status decision tool to a group of approximately $20 - 30$ oil field operations and maintenance personnel. The group will also include supervisors and may include other personnel involved in the field area but not directly responsible for operations and maintenance activities. This activity will comprise part of a one-day workshop to introduce and provide training on the Pipeline Operations & Maintenance manual for a field area. The activity will be a lesson which teaches a concept in its fullness. The concept is the pipeline status decision tool which will help field personnel take appropriate steps to protect pipeline integrity and ensure regulatory compliance when a pipeline is removed from service, either temporarily or permanently.

The activity has been selected as one of three key concepts which must be introduced and practiced during the workshop. Other activities will address the other concepts, likely with a similar design. All the concepts presented will be part of the Pipeline Operations & Maintenance manual on which the workshop is based.

4.2 Purpose of the Activity

The purpose of this activity is to increase the confidence and competency of operations and maintenance personnel in dealing with pipeline decommissioning decisions and other status changes in the field. Ultimately, the purpose of teaching the decision model to these participants is to ensure regulatory compliance and that appropriate actions are taken to assure the integrity of the pipeline when it is removed from service. Hopefully, the learners will see this decision model as a tool which will make their job in the field easier.

4.3 Desired Outcomes

4.3.1 Performance Outcomes

The desired performance outcomes from this activity are:

- an increased level of regulatory compliance at the field level as a result of successful application of the pipeline status decision tool
- an increased level of integrity management compliance at the field level in pipeline suspension procedures

4.3.2 Learning Outcomes

The desired learning outcomes from this activity are:

- Increased awareness of the importance of pipeline suspension to pipeline integrity management
- Increased awareness of the regulatory requirements for pipeline status reporting
- Understanding of different roles and responsibilities for pipeline status changes

4.3.3 Competencies

The desired competencies from this activity are:

- Competent use of the pipeline status decision tool

4.4 Concepts

The overall focus of the workshop is to increase awareness of the contents of the Pipeline Operations & Maintenance manual. The *pipeline status decision tool* and associated issues around changing pipeline status and decommissioning procedures has been identified by the client as a key concept to focus on in the workshop to increase competency in the field. The other concepts that will be focused on in the workshop are *pipeline leak reporting* and *pipeline crossing and backfill inspection report forms*. All three of these concepts are covered in detail in the Pipeline Operations & Maintenance manual, along with many others. These three key concepts will be focused on during the workshop to try to increase competency in these areas. The remainder of the workshop will be spent increasing the participants' awareness of the remainder of the manual contents.

The three concepts to be covered in detail in the workshop are all problems that operations and maintenance personnel have to deal with somewhat frequently in the field. They are not "day to day" activities, but generally occur as exceptions and additional demands on available time. My perception is that most of the personnel present at the training will not initially consider the Pipeline Operation & Maintenance manual as a tool to help them deal with these problems more effectively. This is where we need to try to shift their thinking, and the pipeline status decision tool should help to do this. This will be the concept we present first in detail to help to achieve this shift and therefore we will schedule more time to focus on this concept than the others.

In order to successfully apply this particular concept in the field, we have to communicate the perspective that regulatory compliance in this area and maintaining the long term pipeline integrity is more important than day to day operational requirements. Often this area is neglected in the field due to lack of time, however, neglect can lead to serious regulatory consequences or pipeline leaks due to corrosion, both of which will take up even more time if they occur. This perspective will be the focus, we need to try to communicate that following these processes up front will save them trouble in the long run.

Depending on the resulting design of the entire workshop, it may not be practical to cover all three concepts in one day. If we have to reduce this to two concepts, we would cover the pipeline status design tool and pipeline leak reporting, to keep the focus on integrity management. Integrity management is really the theme of the workshop, delivered through the requirements of the Pipeline Operations & Maintenance manual.

Within the pipeline status decision tool activity, there are three sub-concepts to be presented. We need to provide some background on the regulatory requirements for pipeline status changes. Secondly, we need to present the pipeline status decision tool and allow them to practice using it. Finally, we need to review the contents of the pipeline suspension and decommissioning procedures (the majority of the personnel present should already be familiar with these procedures).

4.5 Outline

The pipeline status decision tool activity will comprise approximately 3 hours of the total workshop. There will be some introductory material on pipeline integrity management that is presented before this activity commences. We will start this activity after the first coffee break in the morning and it will carry through until after lunch (2 hours in the morning and 1 hour after lunch). The outline for the activity will be as follows:

1. *Coffee Break*
2. Pipeline status changes – regulatory requirements
3. Pipeline status decision tool
4. Pipeline suspension and decommissioning procedures
5. *Lunch*
6. Practice using pipeline status decision tool

4.6 Design Pattern

Based on the outline above, the following design patterns will be used:

Outline Item	Design Pattern to be Used	Comments
Pipeline status changes – regulatory requirements	Interactive Lecture Pattern	This is really to increase awareness
Pipeline status decision tool	Discovery Pattern	This is the key concept and where we want to build competency
Pipeline suspension and decommissioning procedures	Specific Review Pattern	This is a review – personnel should already be aware of these procedures.
Practice using pipeline status decision tool	General Practice Pattern	This is the most important activity as we want to be sure participants know how to apply the tool in the field.

5 The Pipeline Status Decision Tool Activity

The pipeline status decision tool is a flow chart process that allows people to assess their situation and determine what the required action(s) are to ensure regulatory compliance and assure pipeline integrity.

5.1 Pipeline status changes – regulatory requirements

The first sub-concept to be presented during this activity is an overview of the regulatory requirements in Alberta for pipeline status changes. The purpose of this activity is to increase awareness of the regulatory requirements so the design pattern selected was the Interactive Lecture pattern (Herasymowych & Senko, 2003, p. 82). Because this is not the most important part of the activity, I have selected a shortened form of the pattern starting at Element 4 (Examine), then moving to Element 2 (Analyze) and finishing at Element 3 (Test).

The design used for this activity will include the following steps:

- Element 4: Short interactive lecture on regulatory requirements (10 minutes)
- Element 2: Appreciative inquiry strategy where learners will answer questions individually about how the regulatory requirements for pipeline status changes are currently handled at the field level (Herasymowych & Senko, 2003, p. 139). The Whole Thinking template will be used to develop these questions (Herasymowych & Senko, 2003, p. 166) (10 minutes)
- Element 5: Group activity (groups of 2) to share answers to the appreciative inquiry questions answered individually in the previous step (5 minutes)

5.2 Pipeline status decision tool

The next sub-concept for this activity will be to introduce the Pipeline status decision tool. The purpose of this activity is to build competency in this tool and as a result in how to deal with decisions regarding pipeline status changes at the field level. The approach for this sub-concept will be based on the Discovery Pattern (Herasymowych & Senko, 2003, p. 92). This pattern introduces a new concept by allowing the learner to discover the concept from experience.

Because we will spend additional time practicing using the tool later in the session, I will again shorten the pattern to suit my needs. The shortened pattern will start at Element 1 (Connect), then move to Element 3 (Integrate), then move to Element 5 (Test).

The design used for this activity will include the following steps:

- Element 1: Using the Action learning strategy (Herasymowych & Senko, 2003, p. 136), I will introduce the action learning groups that we will use for the rest of the workshop. The groups will first individually identify a real life problem they have encountered in the area of pipeline status changes at the field. They will then share this in groups of 2 and then finally in groups of $4 - 6$ and select one problem for the group to work on. The group will then apply the pipeline status decision tool to the problem to discover how the tool works. (40 minutes)
- Element 3: The learners will individually answer a series of questions about their experience based on the Learning Analysis Template (Herasymowych & Senko, 2003, p. 157). They will then share these answers with their Action Learning group (15 minutes)
- Element 5: Each action learning group will share one or two insights with the larger group and there will be some open discussion about how the tool works. (10 minutes)

5.3 Pipeline suspension and decommissioning procedures

The next sub-concept for this activity will be to review the pipeline suspension and decommissioning procedures. The purpose of this activity is to reinforce the importance of following these procedures in the field and to ensure all participants have a good understanding of how they should be used and where resources can be found. The approach for this sub-concept will be based on the Specific Review Pattern (Herasymowych & Senko, 2003, p. 102). The pattern incorporates two elements, Element 3 (Integrate) and Element 5 (Test).

The design for this activity will include the following steps:

- Element 3: Ask the learners to individually review the procedures and write down any questions or issues they may have about them. Then ask them to share these questions with their action learning groups. (20 minutes)
- Element 5: Ask each action learning group to share one or two insights from the review (5 minutes)

5.4 Practice using pipeline status decision tool

The final sub-concept in this activity will be to practice using the pipeline status decision tool. The purpose of this activity is to reinforce the tool introduced earlier in the action learning groups and ensure the learners understand how to apply it in the field. The approach for this sub-concept will be the General Practice Pattern (Herasymowych & Senko, 2003, p. 118). The pattern incorporates the following elements: Element 6 (Apply), Element 1 (Connect), Element 2 (Analyze), Element 3 (Integrate), Element 5 (Test) and Element 7 (Adapt).

The design of this activity will be based again around the Action Learning groups. The groups will be asked to select another situation as they did previously and then to analyze it using the pipeline status decision tool. This time, the groups will be asked to select a situation which is significantly different to the first situation they analyzed. The elements of the pattern will be covered through this activity in the following ways:

- Element 6: By asking the group to select a significantly different situation to the one they previously analyzed
- Element 1: Selecting the real life situation
- Element 2: Analyze the situation in the action learning groups by asking the situation owner a series of questions before using the tool. These questions will be provided in a template to the groups.
- Element 3: Integration and discussion of the questions and answers within the action learning group. Then application of the answers to the pipeline status decision tool.
- Element 5: Each action learning group will be asked to share insights from their experience with the larger group

The action learning activity to this point will be designed to take approximately 30 minutes.

- Element 7: Learners will be asked to use the pipeline decision tool to individually evaluate a situation they have been involved in. They will then discuss the results in their action learning groups and then share insights with the larger group (30 minutes).

6 Conclusion

This assignment has had a significant impact on how I would approach course design in the future in my area of expertise. The assignment has reinforced the power of the design system model presented in Herasymowych & Senko's text and has illustrated to me that once you understand the learning cycle it is simple to integrate activities

which provide a balanced approach to learning and cover each of the learning orientations. It is imperative that the time is spent up front in the design stage to ensure an effective design. If the design is effective the facilitator will create the conditions for learning naturally without any effort during the course itself.

These concepts are directly applicable to the workplace and have the power to make workplace training a much more useful, rich and successful learning experience for all. I have experienced this power in the past through personal experience but did not understand how important design is to the success of learning.

I will directly apply the design system model and my deeper knowledge and understanding of learning styles to course design in my job whenever I have the opportunity. I am finding more and more gaps in the market for effective training because traditional methods are not successfully building competency. Using this design, I think we can design courses for the workplace that truly build competency and make learning in the workplace a reality.

7   Bibliography

Herasymowych, M., & Senko, H. (2003). *Revving Up Thinking and Learning Course Design Guide.* Calgary, Alberta: MHA Institute Inc.