

OPERATOR TRAINING BY DIFFERENT LEARNING STYLES



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ABSTRACT

It is well known and accepted that people learn in different ways. Wannon Water now has the technical resources to allow Operators to learn out in the field by viewing a CD. Recently a CD was created for inexperienced Operators covering various theoretical and practical aspects of chloramination. A great deal of consideration has gone into the content, layout and delivery of the CD and the accompanying booklet to make learning simple and even enjoyable, while still containing detailed and high level information. The focus of the CD was always on the Operator and this has proven to be a sound approach as feedback from Operators, including Senior Operators, has been very positive. Wannon Water will now create more CDs on various aspects of water treatment to assist with future training. Issues encountered while developing the CD included providing sound, getting video demonstrations to play once they were burnt to CD and circulating the draft. In the future Wannon Water will look to provide field demonstrations utilising mobile phones.

KEYWORDS

Learning, Visual, Auditory, Presentation, Training, Water Industry, Chloramination, CD.

1.0 INTRODUCTION

My background includes on-campus university learning for a year and a half, then exiting to complete my study via distance education. While finishing my science degree I entered the water industry as a Treatment Operator. I found that distance learning involved a huge amount of reading (Figure 1a). Sometimes I couldn't grasp concepts due to being unable to properly interpret what was written. I found that some lecturers used unnecessarily complicated language. When it came to equations, I found it hard to see where numbers came from when learning a new calculation, especially if the lecturer had missed certain steps, such as conversions. I spent hours agonising over calculations even though I enjoyed maths. In general, I tired quickly when reading a lot of technical information. I enjoyed learning by visualising and listening (Figure 1b) rather than reading and I found that I retained information better if it was taught in that manner. As an Operator I was the same. I was learning better by being told and shown rather than been given something to read.

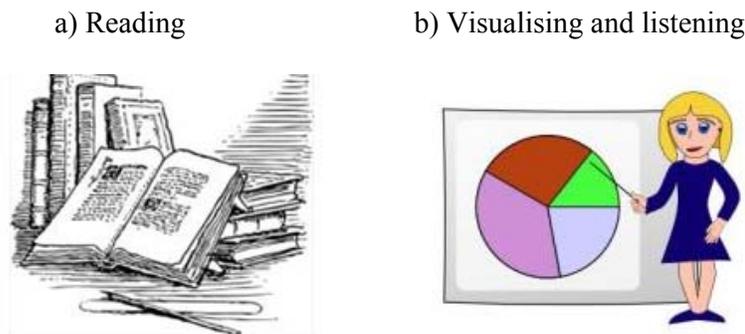


Figure 1: *Common styles of learning*

1.1 The CD

The learning methods used at Wannon Water have been traditional and include the Water Industry Training Centre, one-on-one training and written procedures. Advances at our Corporation mean Treatment Operators now have their own personal lap top. Extra resourcing and retirements at Wannon Water in recent years means we have many new, motivated but inexperienced Operators. Recent Operator feedback has suggested that the use of visual/auditory learning via CDs would be beneficial. This type of training information can be paused and replayed when required, allowing Operators to focus on the area/s they require. The CD is an extra tool/resource for Operators and is in no way intended on being a replacement for the current traditional ways of learning. The CD (Figure 2a) comes with a booklet (Figure 2b) which contains all the information that is narrated in the CD. The booklet has an additional feature, of a fictional scenario of Operators at a water treatment plant experiencing issues with chlorine residual relating to chloramination.



Figure 2: *The CD and accompanying booklet*

I chose chloramination as the first topic as it can be managed by Operators and free ammonia exceedences have been an issue within our Corporation.

The CD includes:

- basic background information on chloramination;
- an explanation of the chlorine curve;
- tests that can be done to work out where your plant is on the chlorine curve;
- demonstrations of tests; and
- examples of how to calculate the chlorine to ammonia ratio.

PowerPoint 2003 was used for creation of the bulk of the CD, with video used only for recording demonstrations of tests. Windows Movie Maker was used to edit the video. The video was pasted into the PowerPoint. I chose PowerPoint because I am familiar with using it and I could create and edit a lot of information quickly and easily and without requiring extra resources (unlike if I was videoing it). PowerPoint allowed me to introduce each aspect of a topic step-by-step. I used the narration function to record on each slide.

2.0 DISCUSSION

Creating a CD has many benefits in addition to the visual/auditory learning style.

2.1 Other Positive Aspects of the CD

- CDs are specific to the Corporation, which enhances the learning experience.
- Being in an appropriate format, Operators can use them while on the job, which can aid Operators in individually solving minor issues. This makes the Operator feel more independent and confident.
- The CD is saved in chapters so that a specific section can be selected
- It has been designed to be simple yet specific
- The CD is step-by-step in its delivery, whether explaining the chlorine curve, demonstrating tests or completing various calculations. This allows the Operator to see exactly what aspect is being discussed.

The motivation behind the CD is to make learning enjoyable and achievable for all styles of learning. This is why the booklet to accompany the CD was created. It allows for people who like learning via reading material to learn the same information.

2.2 Design of the Accompanying Booklet

Features of the booklet include making use of “white” space, meaning there is not too much information on each page. This is because I didn’t want to overwhelm the Operator with too much information at once. Thought has been given to making sure that new topics are started on a new page. There are lots of pictures within the booklet. Pictures were also chosen carefully. They are designed to complement and enhance what is being taught on that page. I didn’t want the Operator starting to think about other things relating to the topic, so if a picture said too much I modified it or didn’t include it.

Where the CD had practical demonstrations, I opted to:

- Start with dot points of what was needed (powder pillows, cell, thermometer), and also included the instrument range.
- Use step-by-step boxes (Figure 3). I used the diagrams created by the manufacturers of our instruments.
- Use a minimal amount of words; our Operators were familiar with the instruments so basic information was left for the pictures to illustrate, e.g. no writing was written when putting the program number in, just a picture and; the Operators know that the cell has a tab, so I didn’t need to include the extra words (Figure 3) but made sure that the procedure was still accurately reproducible using what we provided.

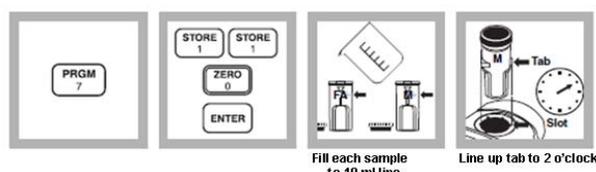


Figure 3: *An example of part of a demonstration in the booklet*

2.3 Calculations

I wanted to make sure that Operators could clearly see where numbers in calculations came from, so I added colour. There are several Operators within our Corporation who are colour blind. As colour blindness is much more common in men and our Operators are predominantly men it was decided to cater for this. I used varied fonts and certain colours in conjunction in order to achieve this (Figure 4). The colours chosen were red, yellow and blue. I chose these colours because although different forms of colour blindness show these colours differently, they can all be distinguished from one another, see example below (Figure 4).

Ammonia
Completing a drawdown test is an easy way to work out how much liquid chemical has been used. You can convert the rate of drawdown to a volume.

E.g. Drawdown result = 2.20 ml/min
=132 ml/hour
= 0.13L/hour

Different pumps have different drawdown tests, so it is important that you know the specifics of your dosing pump. Some pumps can give inaccurate drawdown results if the stroke rates are low.

Convert to kg (per hour)
Ammonia used x *specific gravity* x **strength (i.e. 25% is 0.25)**
0.13 x 0.92 x 0.25
= **0.03 kg/hour**

a) *How a non-colour blind person would see*

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b) *How a colour blind person would see*

Figure 4: *Using various colours and fonts to enhance learning, including consideration for colour blindness*

2.4 Issues

When the draft CD was circulated to the Operators for comment there were a number of issues identified. The CD is a very large document (432 MB) due to the large amount of graphics and the videos, so emailing it is impossible. I made a number of CDs to send around, but they could not be opened by all Operators. In the end I saved it on our common drive with a link for Operators to use.

Once Operators could open the CD, the next issue was that there was no sound and the video demonstrations didn't play. This was later to be found due to working through Citrix, as Citrix has no audio. To overcome this Operators have to minimise Citrix and play the CD locally. The CD now plays with sound. Our IT department is currently working on the best method to allow the video demonstrations to play.

2.5 Surprises

Senior Operators have also been very positive about the CD and booklet for their own use. The CD was not intended for experienced Operators so this was an unexpected but rewarding surprise. Senior Operators have said that the CD is a good tool to have to refresh them on a subject that they have studied previously, which may be a long time ago. Operators have watched the CD with so much interest that they have picked up minor flaws in the demonstrations. It was great to hear an Operator saying "you used a tissue when you should have used a Kimwipe!"

2.6 Future Direction

We will look to create the CD at a higher sound quality and possibly have this done professionally. We will also re-record and edit out the flaws picked up by Operators.

The uploading of video demonstrations onto mobile phones is intended, so if an Operator wants to view how to complete a test, they can simply reach for their mobile phone, rather than grabbing their computer. Wannon Water is soon to replace all mobile phones so we will look to introduce this resource option after this has happened.

Operators would like more CDs to be created for them. The next request is for a CD on coagulation and flocculation including a section on jar tests.

3.0 CONCLUSIONS

The creation of a training CD and accompanying booklet has enabled Operators of all preferred learning styles to effectively learn about various theoretical and practical aspects of chloramination. The use of a CD for learning has proven even more popular than expected. This outcome means that other CDs will be created on various aspects of water treatment.

4.0 ACKNOWLEDGEMENTS

Thanks to Noel Kenny for inspiring the creation of the CD. Thank you also to all Treatment members who provided feedback or were part of the video demonstrations.