

INCOSE / GfSE Webinar 6 July 2022

How to learn Systems Engineering

(or anything)

Presented by Michael Gainford
and René King



- The foundations for this material are from Lynne Melis and the Coaching Café (South Africa)
- In turn, that is built on pioneering research carried out by Prof. Sylvia Downs at Cambridge University over a period of 23 years

Reference

Downs, Sylvia: *Learning at Work - Effective Strategies for Making Things Happen* (1995)
Kogan Page Ltd, London.

And thanks to Matthew Wong (Project Performance International) for graphics support

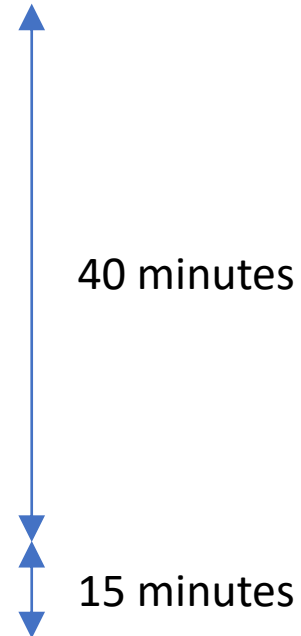
Copyright Statement

Copyright Certification Training International. This document may be reproduced and distributed without restriction provided that all reproductions contain the original copyright statement in the original form and location. Derivative works may be produced provided each derivative work contains a copyright statement referring to the content in which CTI holds copyright, in a form and in a location no less prominent than the copyright statement on the original. Copies and derivative works may not be used for the delivery of training for profit

Take-away messages

- Understand learning as “an on-going process involving learners and learning facilitators”
- Consider that you as a learner must take ownership of your learning outcomes and learn more about learning.
- Reflect on the multiple actors in a learning system

- 1) Introductory context
- 2) 10 illustrated principles of learning
- 3) Progression during a learning event
- 4) Further growth following a learning event
- 5) Propagation of learning
- 6) Practical tips
- 7) Reflection
- 8) Questions and Answers
- 9) Contact details



- Learning is **social** and depends on **engagement**
- Understand how to learn
- Take responsibility for your own learning.

Some definitions for this presentation

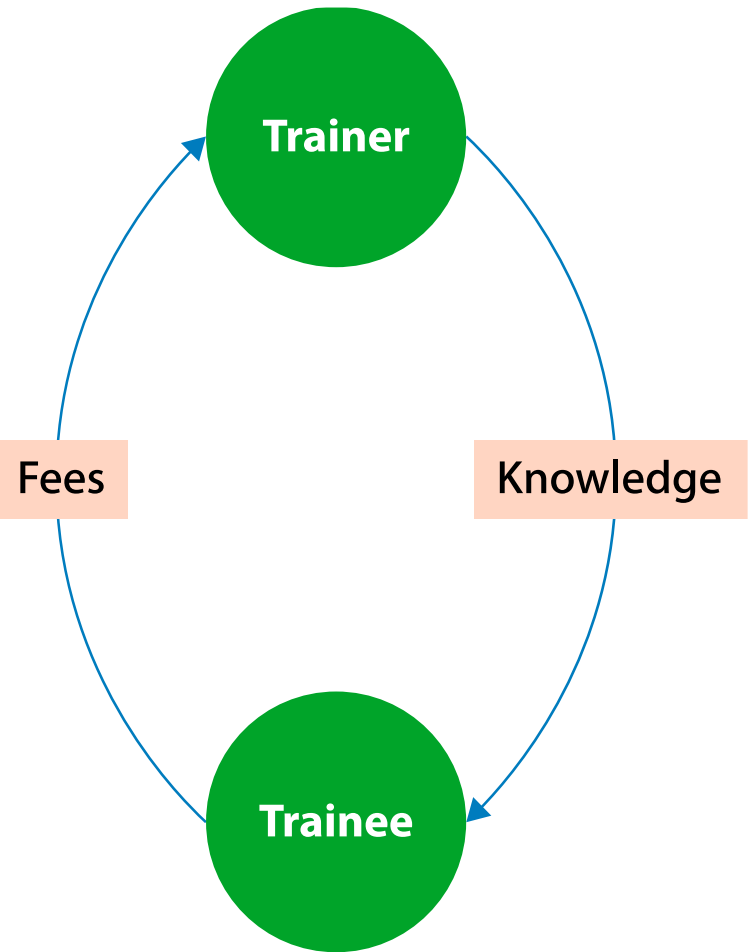
Learner: somebody who adds to their knowledge

Learning event: a planned activity via which one or more people add to their knowledge

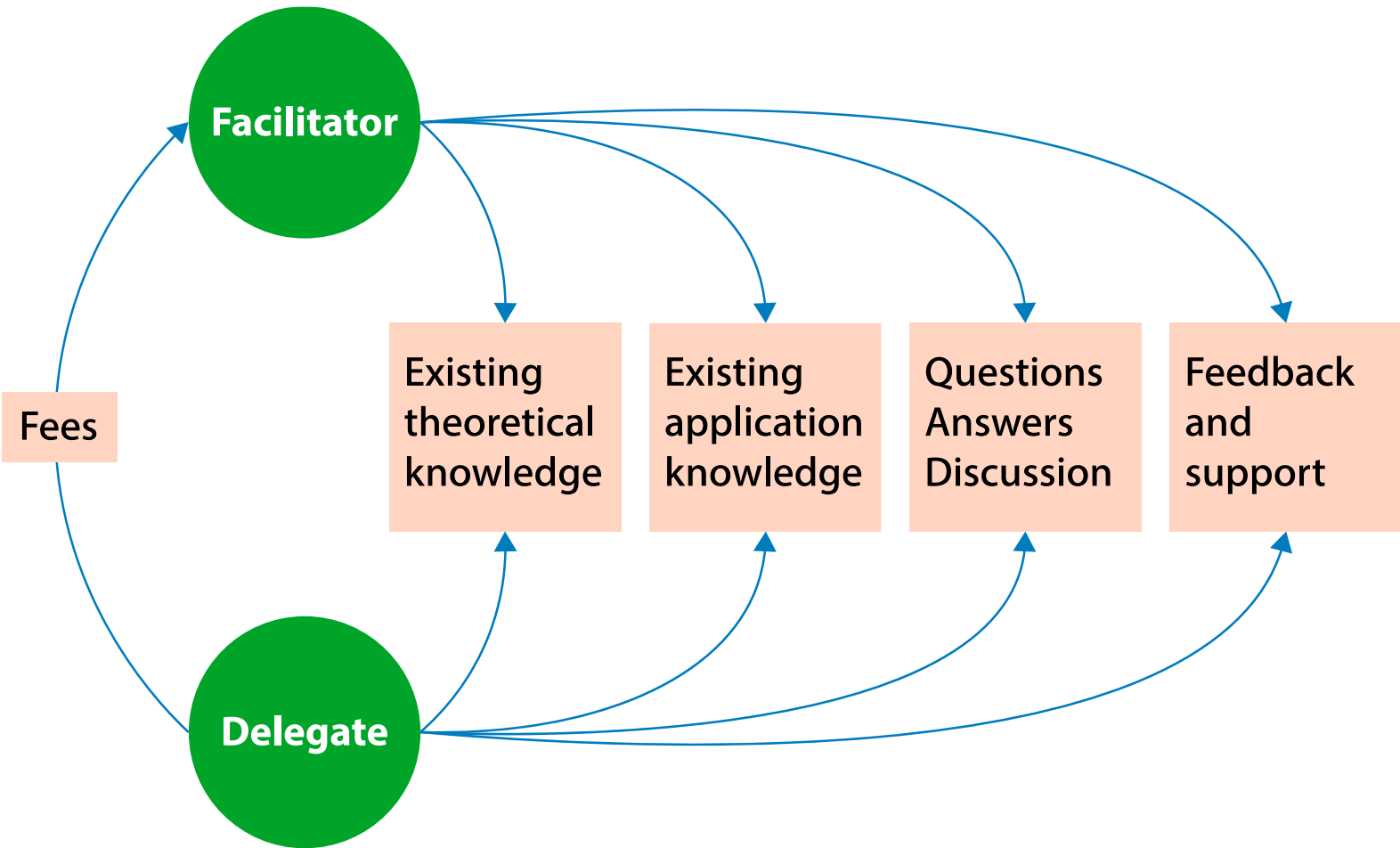
Learning facilitator: somebody who runs a learning event – also a learner

Delegate: somebody who engages in a learning event

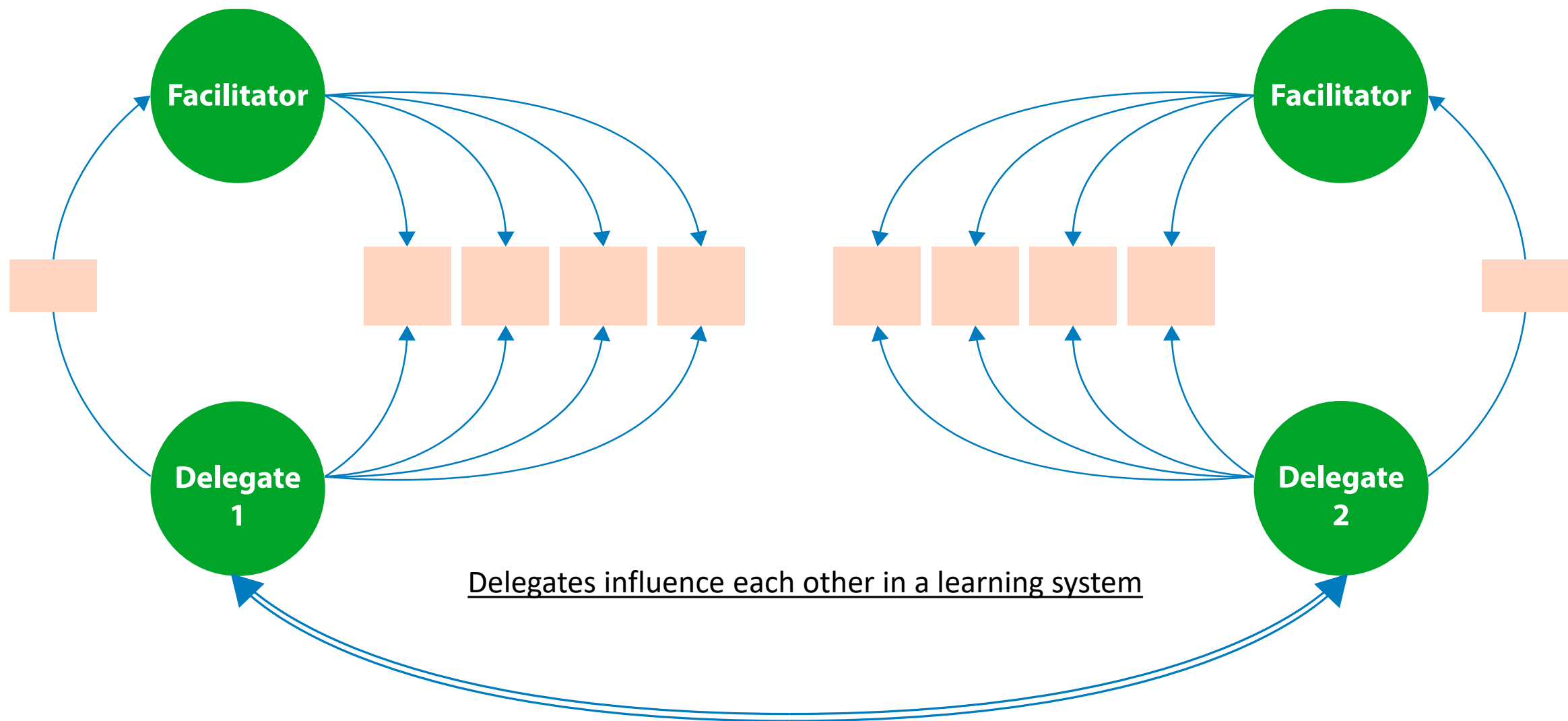
- Three ways of learning:
 - 1) Memorising (facts)
 - 2) Understanding (concepts)
 - 3) Doing
- Getting concepts wrong
- Learning through understanding in different ways
- Questioning, contrasting, challenging, debating and discussing
- Transferring the learning to a different situation



Trainee pays for training



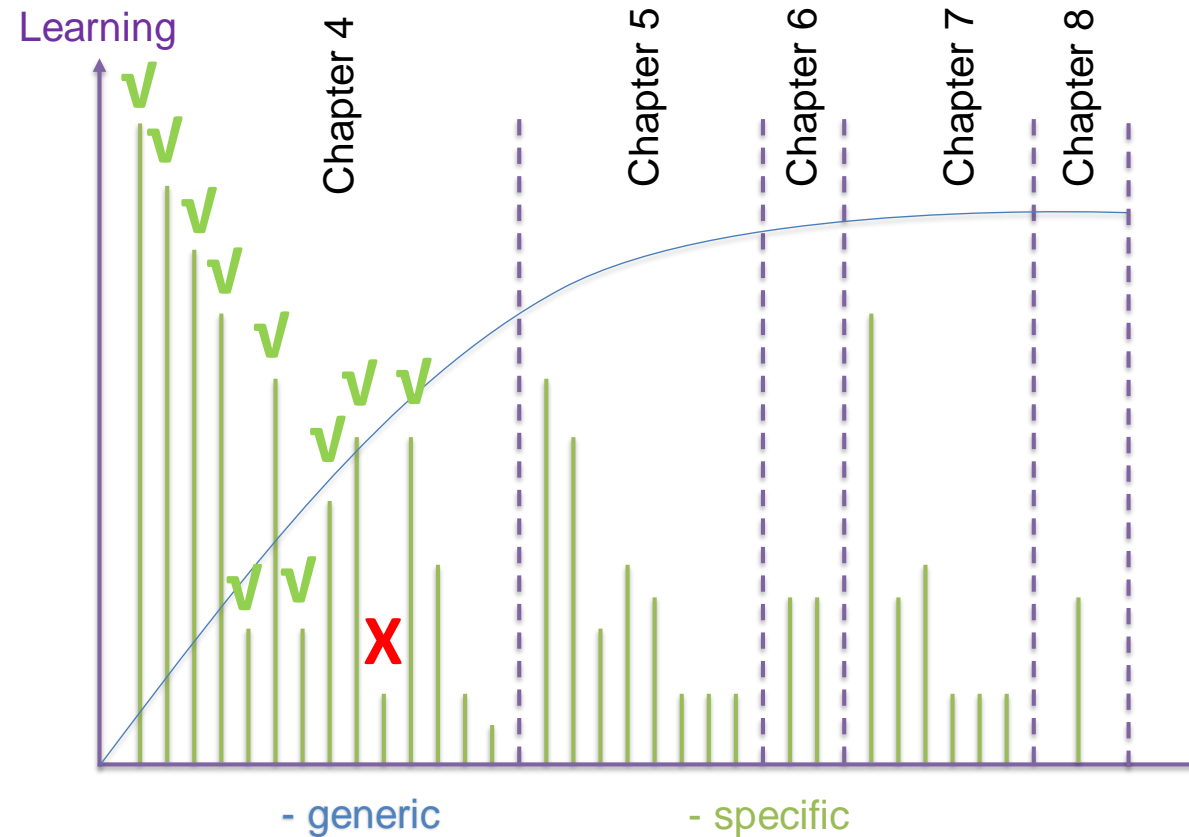
Delegate engages in a learning environment



Delegates influence each other in a learning system

1) Learners need to know where they are going and have a sense of progress towards their objectives.

Illustration



Principles

1

2

3

4

5

6

7

8

9

10

2) The learning environment has to be one of trust, respect, openness and acceptance of differences.

Illustration

Open the learning event with a “Charter” or similar



Principles



3) Being aware of and owning the responsibility for learning lies with the learner. Others can only give information, support and provide feedback.

Illustration

Make this clear in the pre-event communications. Share it and the learning system context diagrams early in the course



Example pre-course briefing pack



✓	✓	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

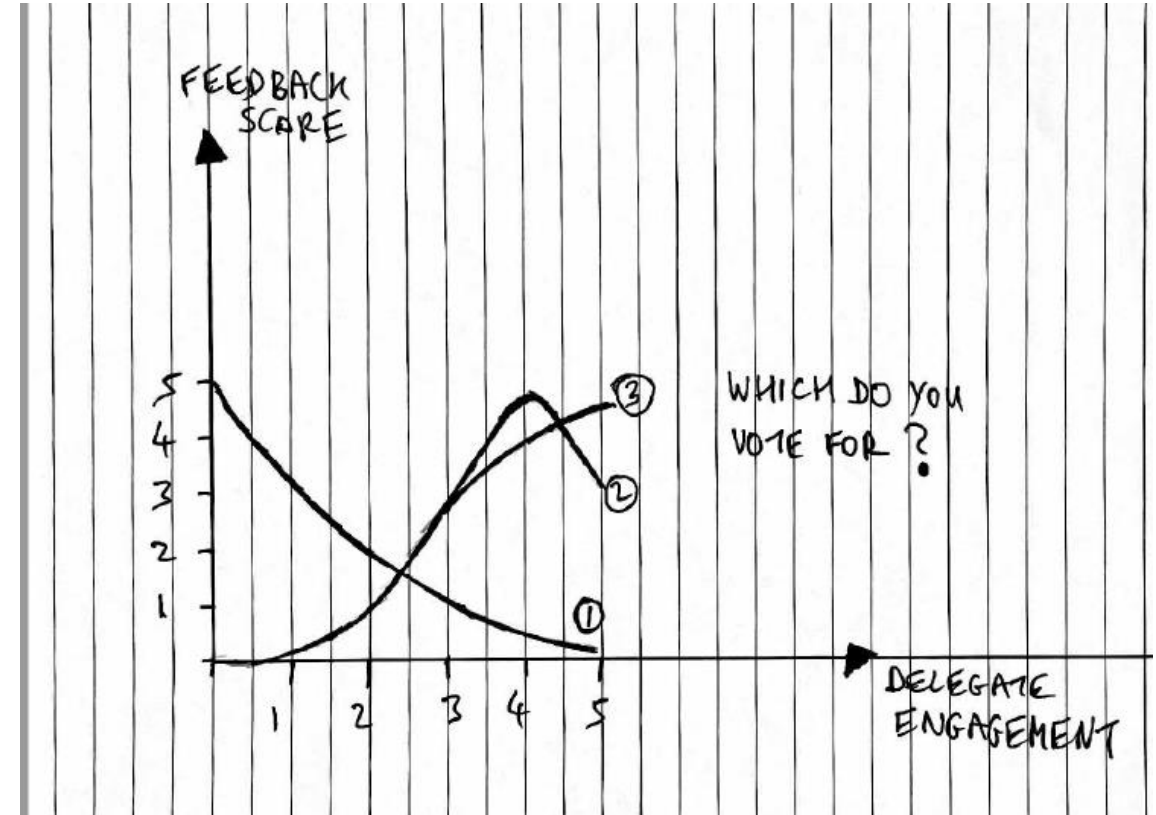
4) Delegates need to participate actively in the learning process.

Illustration

Communication is bi-directional: speaker and listener must each take 100% responsibility for effective communication.

A hypothesis

“Learning event satisfaction scores correlate to delegate engagement”



Principles

✓

✓

✓

4

5

6

7

8

9

10

5) Learning should be related to and use the learner's experience and knowledge.

Illustration 1

Example of a typical workshop:

- What's the purpose of this process?
- In your experience:
 - Examples of when was it done well?
 - Examples when it should have been done better?

Illustration 2

- Use a well-known item to provide a thread through a number of workshops



Principles

✓

✓

✓

✓

5

6

7

8

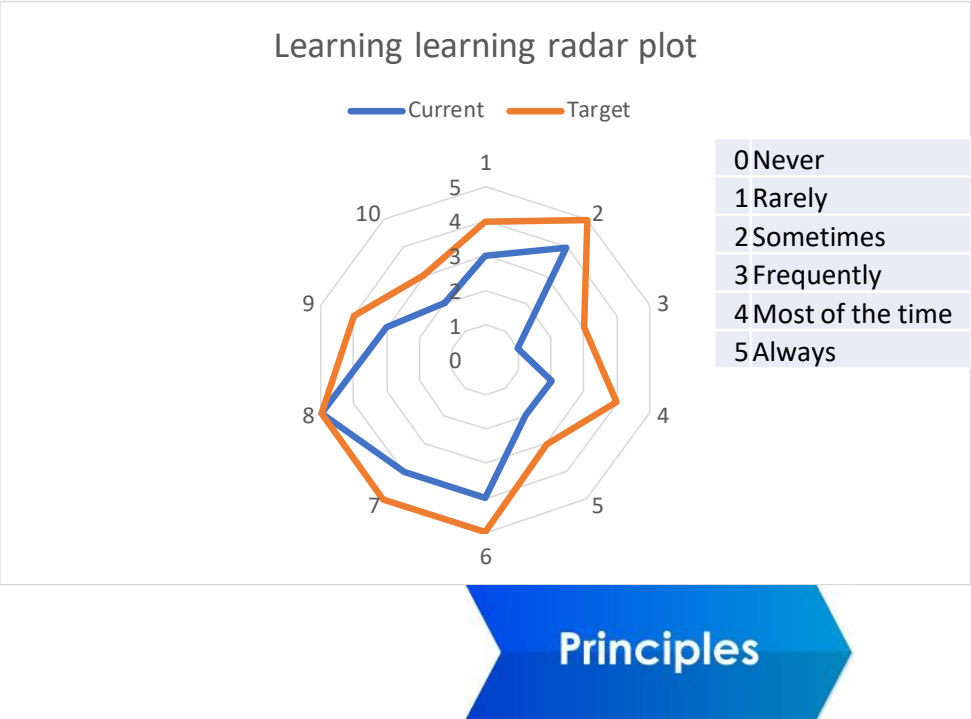
9

10

6) Learning is not only a basic capability but also a group of skills which can be developed/learned.

Illustration

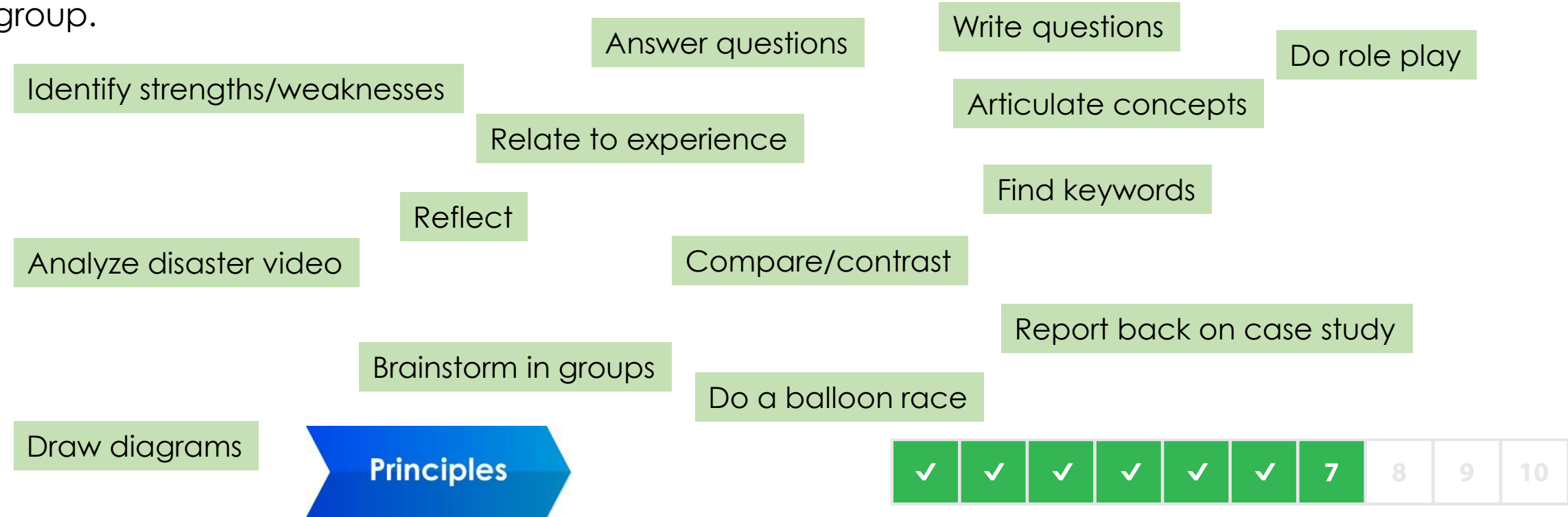
Read about learning. Identify which methods work for you. Try some new ones. Monitor progress on your “learning learning” curve



7) Facts, concepts and skills are learned in different ways

Illustration

A mix of approaches is good, especially given the variety of learning preferences in a group.



8) Getting ideas wrong can be a valuable aid to developing understanding

Illustration

- Workshops, breakout rooms, and class discussions;
- Lightbulb moments;
- Compile your own exam questions.

Principles



9) Effective learning depends on realistic, objective and constructive feedback

Throughout the learning event, give constructive feedback (aimed at the idea, not the person) and provide an opportunity to try again.

Illustration

Delegate's 1st attempt

Q1: The Operator/maintainer training materials are not an input of what processes (Choose two):

- A. Transition process
- B. Verification process
- C. Operation process
- D. Validation process
- E. Maintenance process

Facilitator advice:

"Questions expressed in the negative are avoided"

Delegate's 2nd attempt

Q1: The Operator/maintainer training materials are an input of what processes (Choose three):

- A. Transition process
- B. Verification process
- C. Operation process
- D. Validation process
- E. Maintenance process

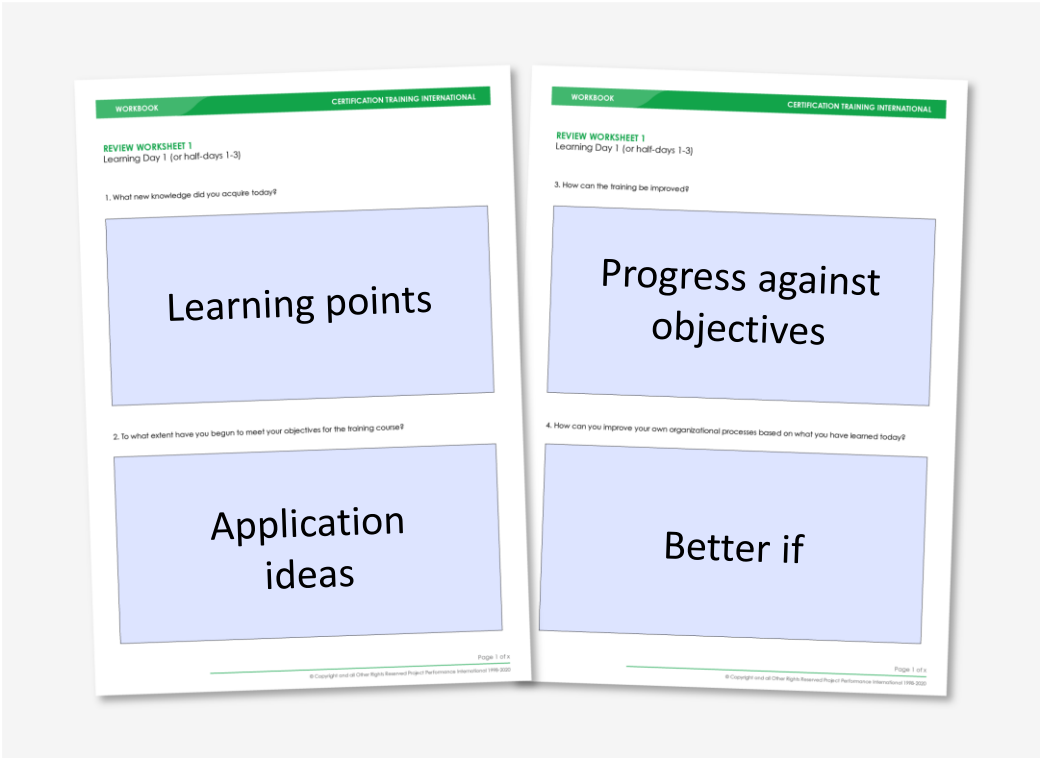
Principles



10) For learning to be processed and assimilated, time must be allowed for reflection.

Illustration

Example end of day worksheet



- 1) Learners need to know where they are going and have a sense of progress towards their objectives.
- 2) The learning environment has to be one of trust, respect, openness and acceptance of differences.
- 3) Being aware of and owning the responsibility for learning lies with the learner. Others can only give information, support and provide feedback.
- 4) Learners need to participate actively in the learning process.
- 5) Learning should be related to and use the learner's experience and knowledge.
- 6) Learning is not only a basic capability but also a group of skills which can be developed/learned.
- 7) Facts, concepts and skills are learned in different ways.
- 8) Getting ideas wrong can be a valuable aid to developing understanding.
- 9) Effective learning depends on realistic, objective and constructive feedback
- 10) For learning to be processed and assimilated, time must be allowed for reflection.



Principles

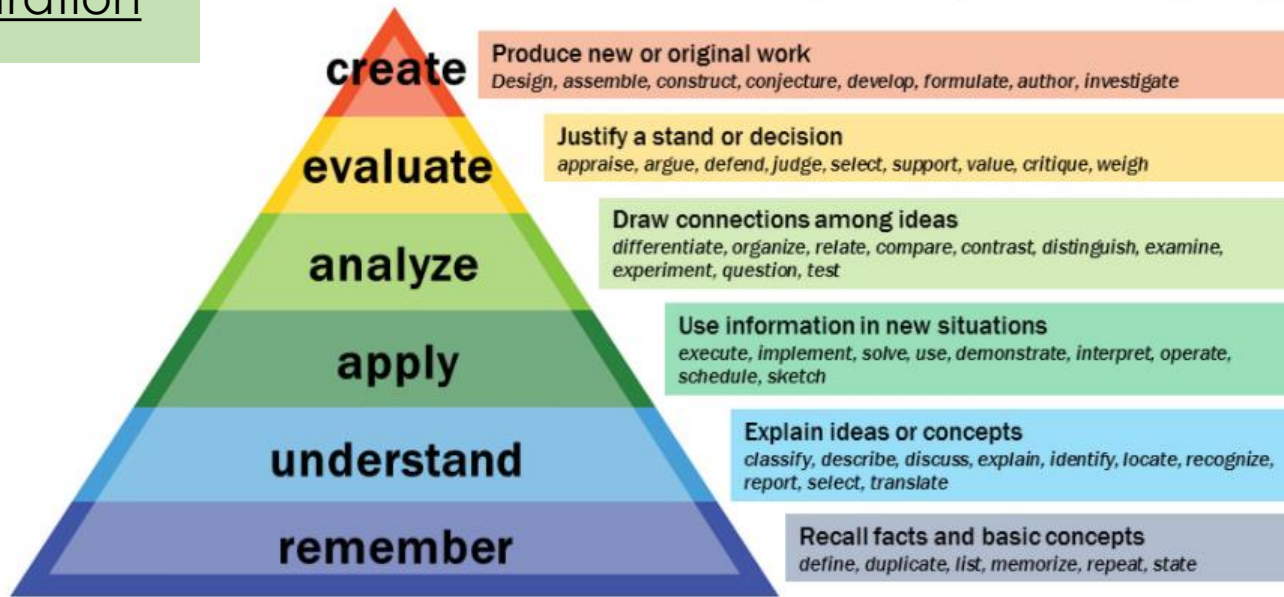
3. Progression during a learning event

So far we have thought about what we are learning; now we need to assess performance i.e. how well we have learnt it.

Should also be used in setting up learning event objectives

Illustration

Bloom's Taxonomy



Vanderbilt University Center for Teaching

Principles

Progression

Acknowledgement:

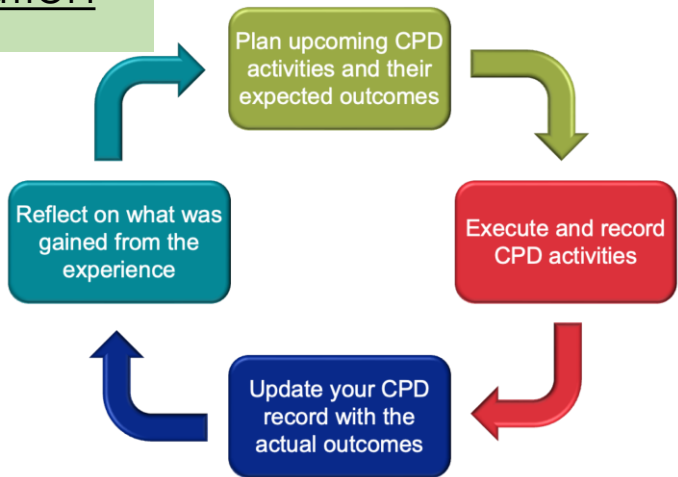
Vanderbilt University Center for Teaching

[vanderbilt university bloom's taxonomy - Google Search](#)

4. Further growth following a learning event

Beyond that, do things stagnate, or is there further growth through continuing professional development and structures such as the INCOSE Competency Framework?

Illustration



Core CPD Cycle

[Diagram on INCOSE UK Website](#)

Activity	PDU
INCOSE Member (5 PDU/Year)	15
Attending 4 INCOSE Chapter Meetings per year (1.25 hour each)	15
Attending 2 other professional society meetings per year (1.25 hours each)	7
Attending the local INCOSE Conference (8 hours per day, 2 days, 1 per year)	48
Attend one 5-day Professional Training Course	40
TOTAL (Over 3 years)	125



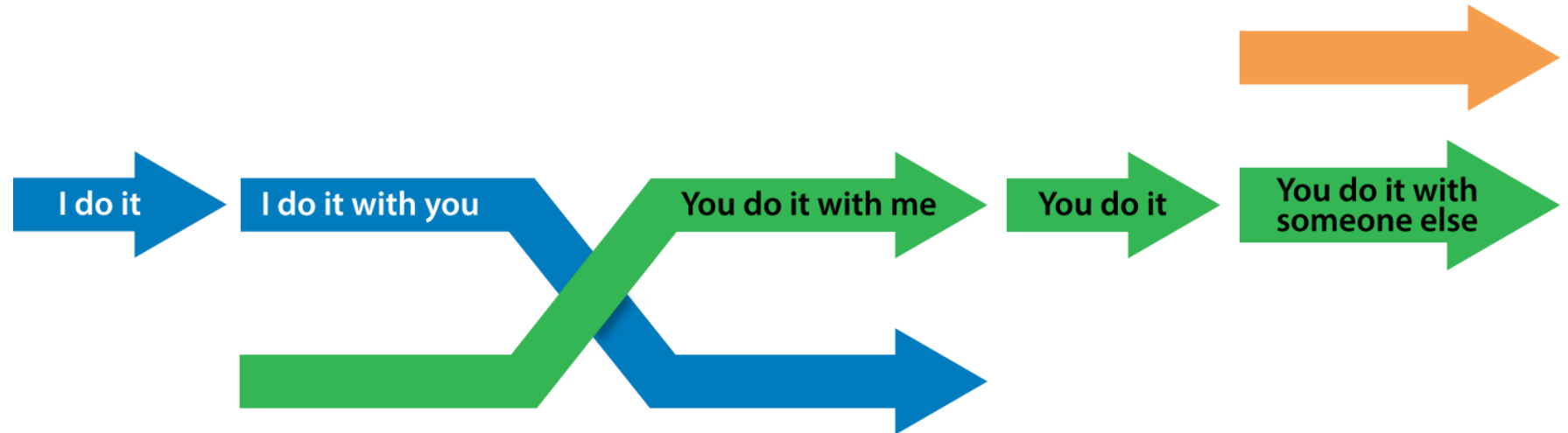
5. Propagation of learning

- Most organizations can't afford to send everyone to a learning event
- Participants must compound the benefit going forwards.

Illustration



John Maxwell, author
of "The 5 levels of
leadership"



6. Practical tips – Cultural sensitivity

Facilitators and delegates must always be aware of cultural issues

Illustration

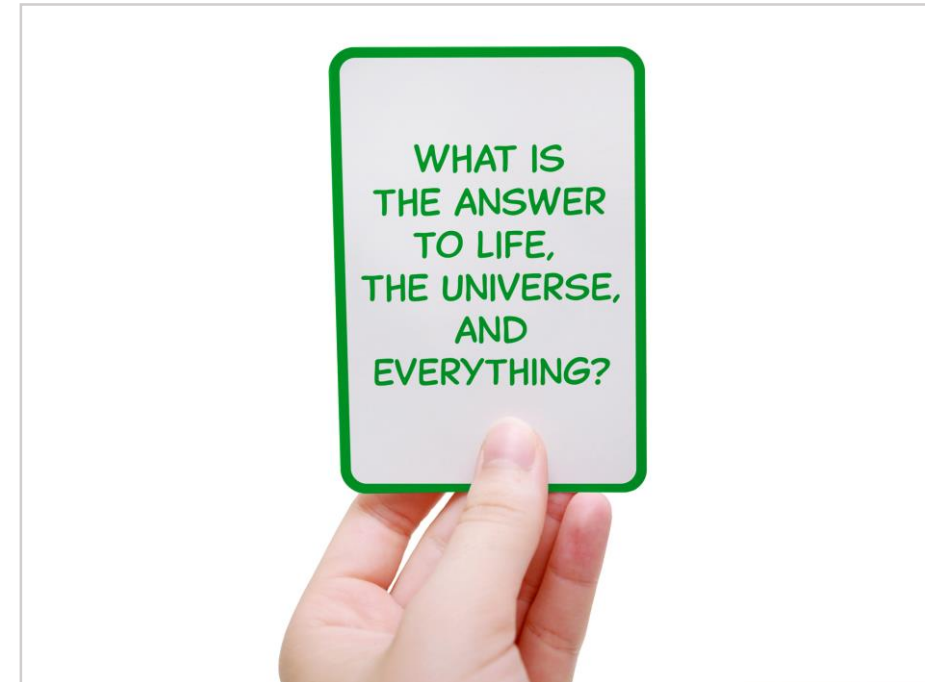
- 1) Some cultures and individuals hate workshops
- 2) Some cultures and organisations have a strong hierarchical power structure
- 3) Some may see age as an indicator of wisdom, when others see it as a downward slope

6. Practical tips – Pair-working

- no chance to opt out of a discussion. It builds confidence and encourages sharing
- rotate the pairings
- exposure to different ideas and individuals creates a richer experience
- Use it during exam revision

Illustration

Use of Flash Cards in pairs

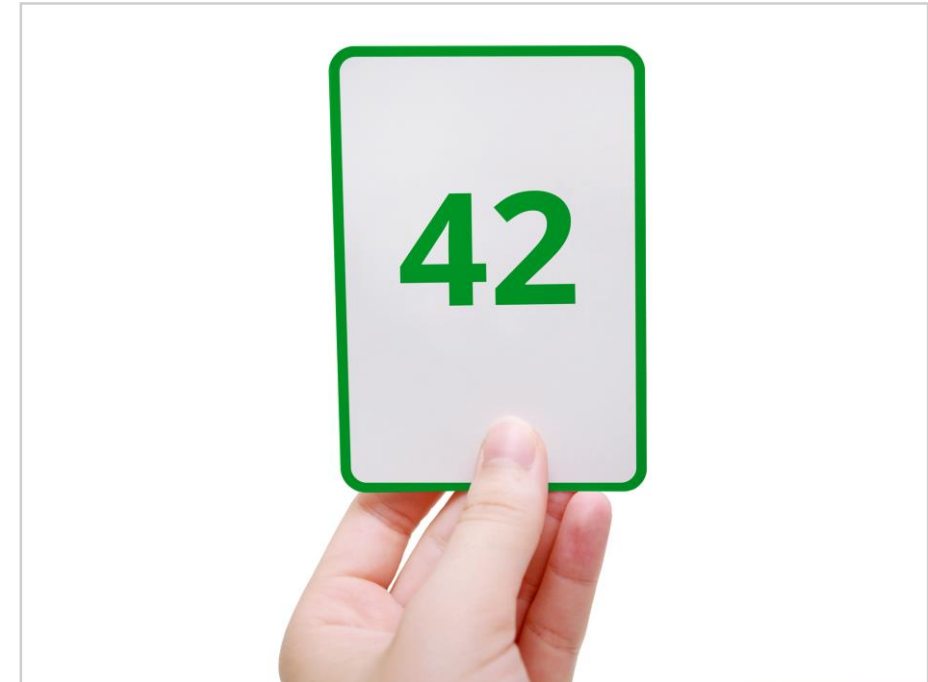


6. Practical tips – Pair-working

- no chance to opt out of a discussion. It builds confidence and encourages sharing
- rotate the pairings
- exposure to different ideas and individuals creates a richer experience
- Use it during exam revision

Illustration

Use of Flash Cards in pairs

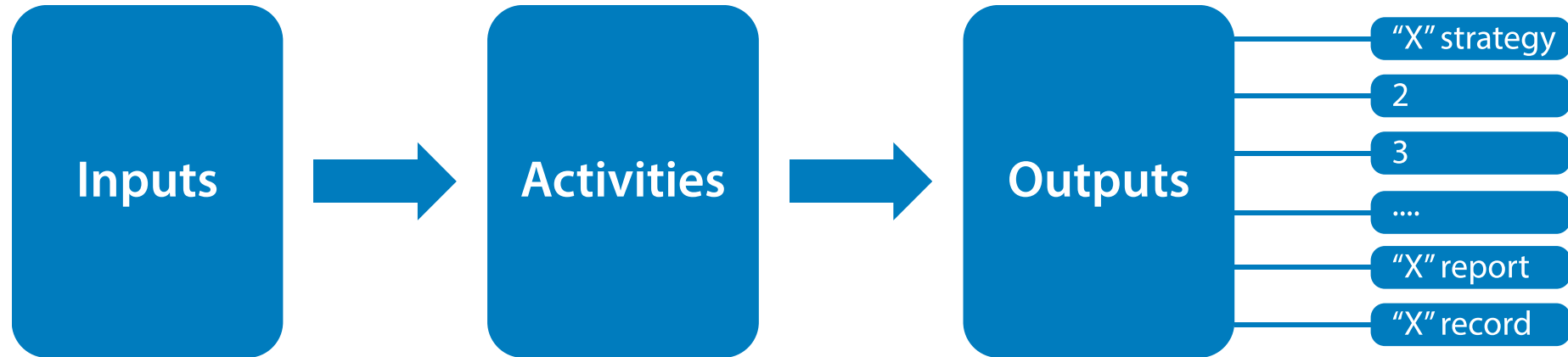


6. Practical tips – Spot the patterns

Look for patterns as a powerful way of learning things. Even when something doesn't fit the pattern, that can become a way of learning it.

Illustration

Typical
handbook IPO
diagram for
process "X"



7. Reflection

Principle No. 10: What did you learn about learning?

- Please post your learning points on chat
- Application of one of the learning principles to the Webinar itself

Questions and answers (15 minutes)

9. Contact details

Michael Gainford

Course Presenter,

Certification International Ltd.

mgainford@certificationtraining-int.com

René King

Managing Director

Certification International Ltd.

rking@certificationtraining-int.com