Leveraging on Digital Technologies to Enhance Learning

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Outline

Changing Landscape

Changing Practices

Examples

The 4.0 Revolution

INDUSTRY

4.0 21st Century - Present — Cyber physical systems, IoT, networks

3.0 20th Century — Automation, computers, electronics

2.0 19th Century — Mass production, assembly line, electrical energy

1.0 18th Century — Mechanisation, steam power, weaving loom

EDUCATION

4.0 21st Century -Present — Personalised and lifelong learning, flexible delivery

3.0 20th Century — Socially constructed, use of computers and internet in T&L

2.0 18th Century — Mass education, teacher-centric

1.0 15th Century — Limited, dictated, apprenticeship-based

Sources:
World Economic Forum 2016 and 2018
Harkins, A. M. (2008). Leapfrog Principles and Practices: Core Components of Education 3.0 and 4.0. Futures Research Quarterly.
FICCI-EY Future of Skills and Jobs in India. (2017). *Leapfrogging to Education 4.0: Student at the core.* FICCI Higher Education Committee.

Changing Habits

Padang in 1 Minute

Digital Age Learning Ecosystem

Digital Age Learning

Demand for bite-sized engaging contents

Personalised on-demand options

Mobile devices as key platforms

Concerns of 4th Industrial Revolution

Changed again?

Replacing jobs

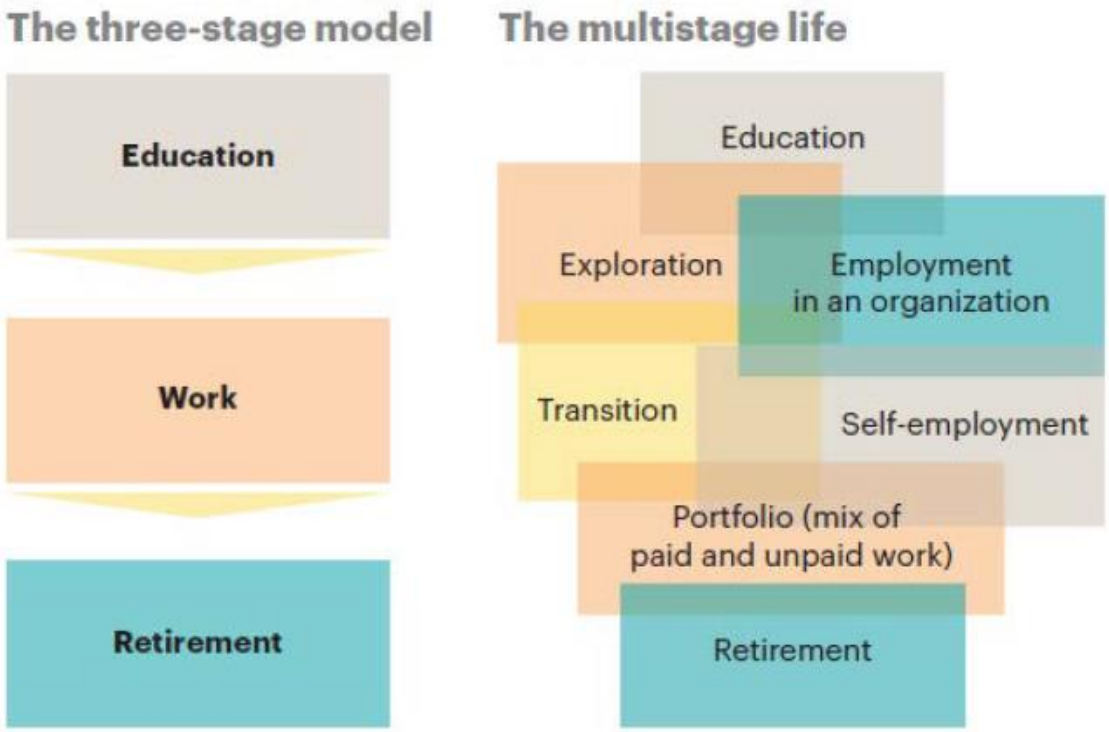
Shortening half-life of Knowledge & skills

- 50% of subject knowledge learnt during the first year of a 4-year technical degree will be outdated by the time the student graduate
- 46% of Asian employers have difficulties filling jobs!
- Only 40% of executives believe new employees have the requisite job skills

A.T. Kearney (2018), p. 2

Concerns of 4th Industrial Revolution

Employment for life time? → **Life-long Employability?**



A.T. Kearney (2018)

Job Skills – Changing Demands

Employment for life time? → **Life-long Employability?**

in 2015

1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity

in 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

Future of Jobs Report, Word Economic Forum

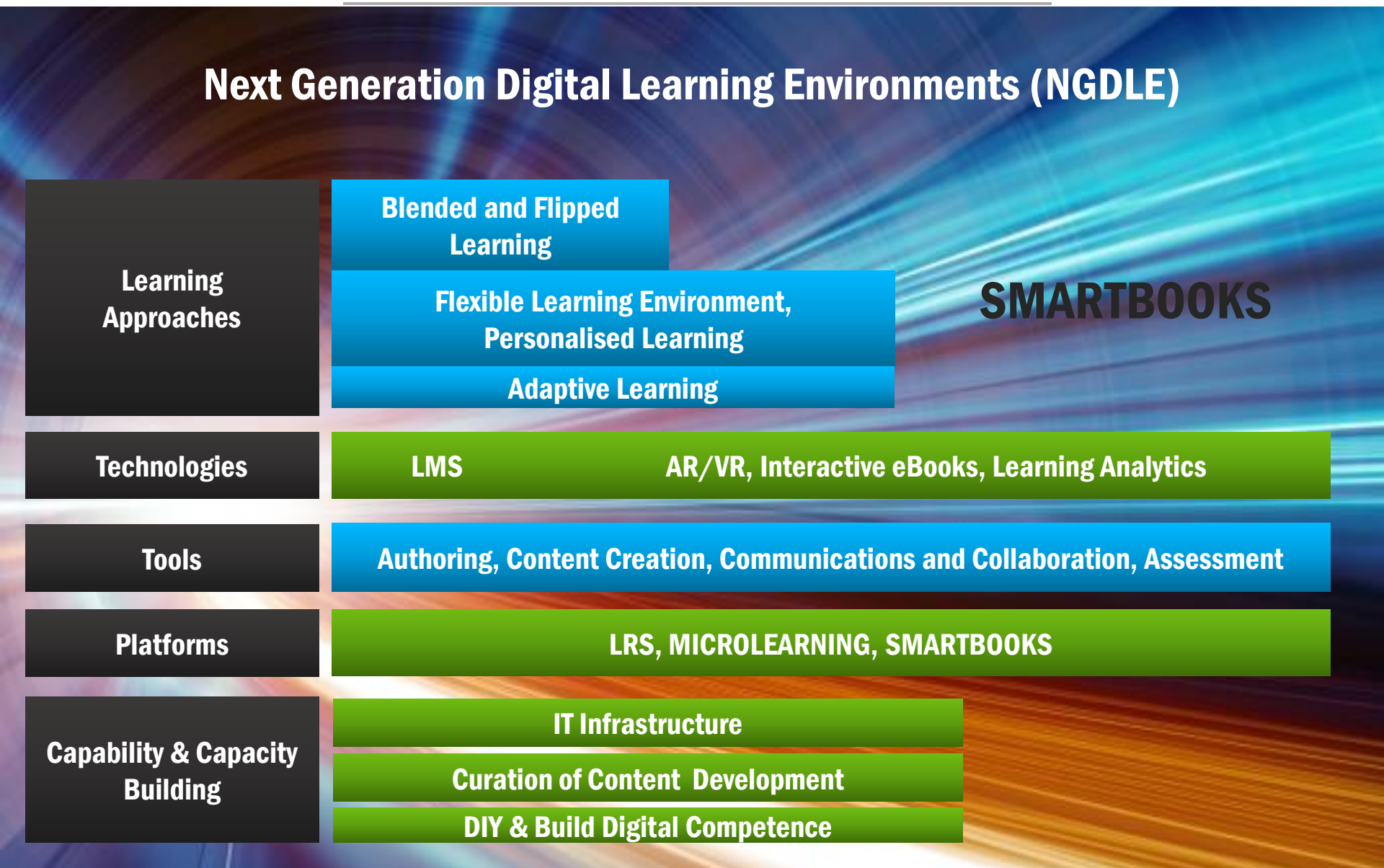
Skills for 21st Century Educators??

Digital Skills ??

Collaborative skills ??

Design Thinking Skills ??

Leapfrogging to Education 4.0



Learning Approaches – Changing Perspective

Paavola & Hakkarainen, 2005

- Are we stuck to authoritative sources of knowledge?
- Topic based content delivery?

Technologies, Tools, Platforms

Examples

- eLearning - learn anytime, anywhere
- Bring Your Own Device
- AR/VR apps
- LMS, LRS
- E-Books

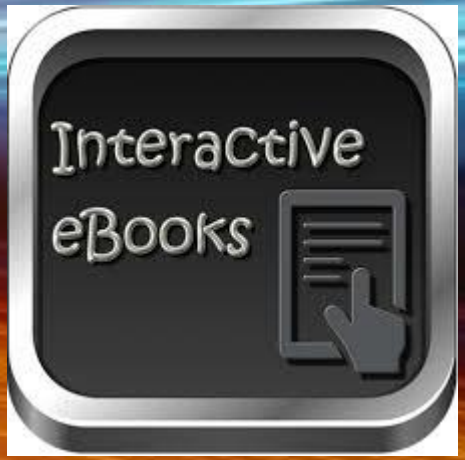
Challenges??

- IT infrastructure
- Staff Capabilities
- Short life of technologies
- Content creation

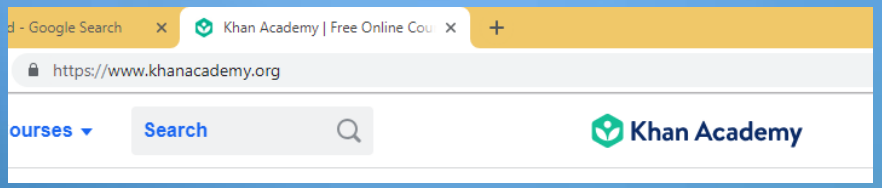
Can we leverage on extensive information, knowledge available online?

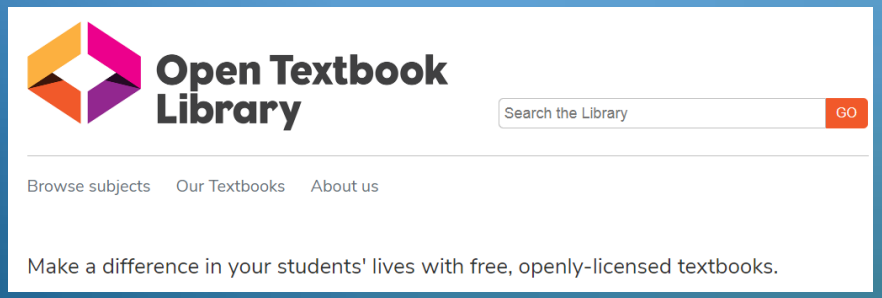
Leveraging on Curation of eLearning Contents - Examples

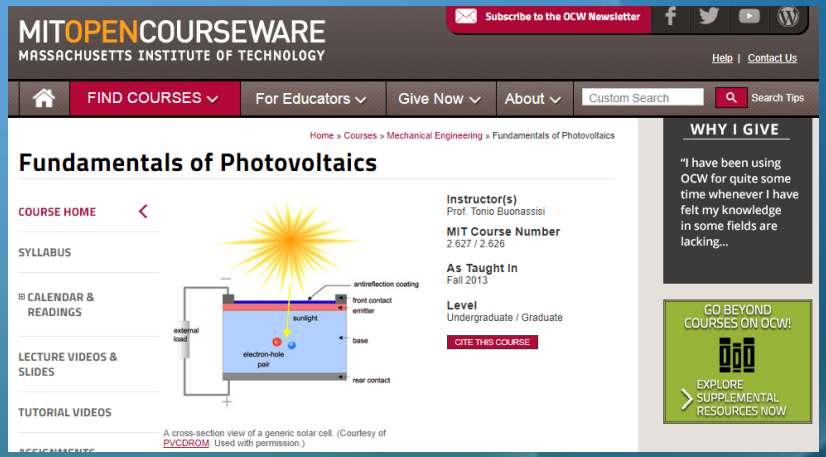
- **Open Educational Resources (OER)**
- **Linkedin learning**
- **Interactive eBooks**

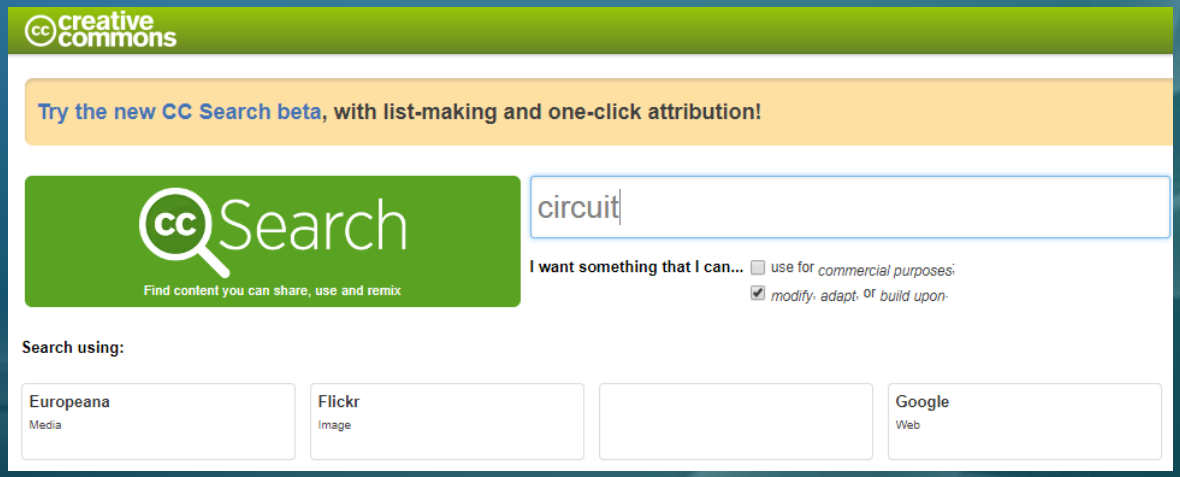


Examples of OER

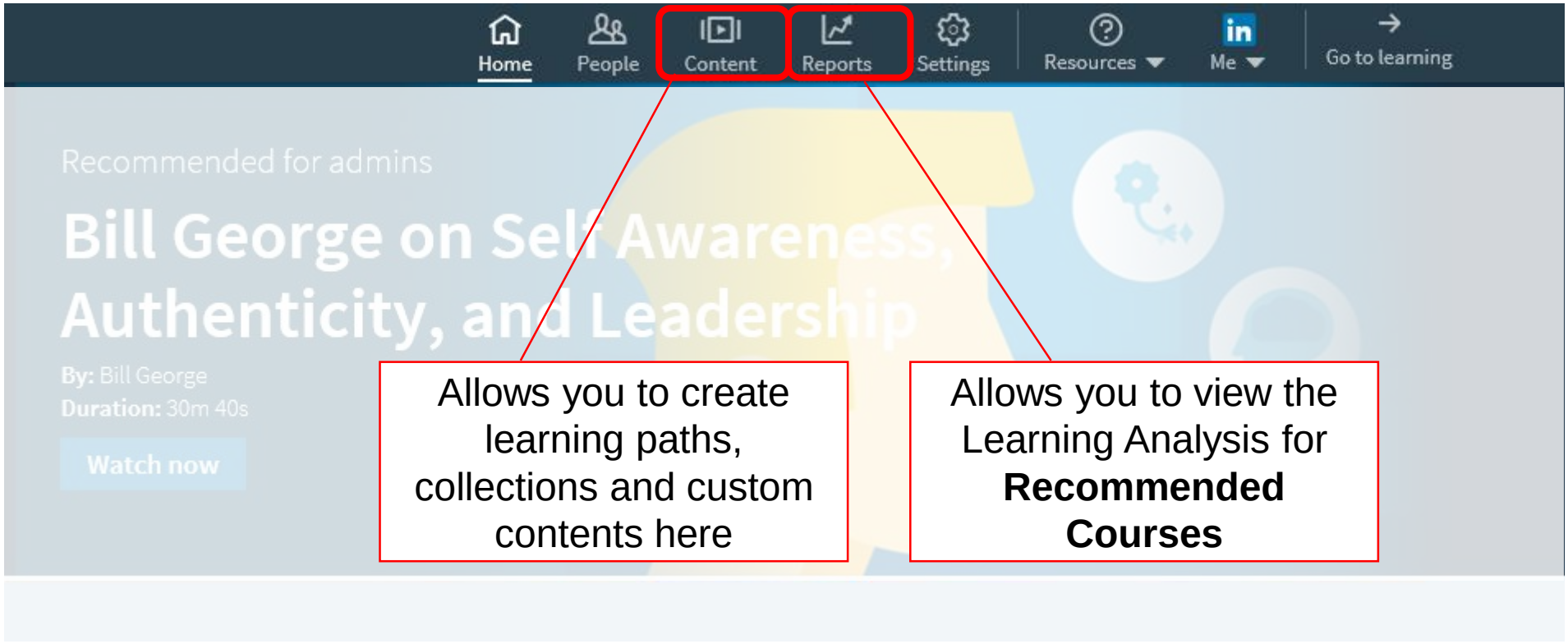




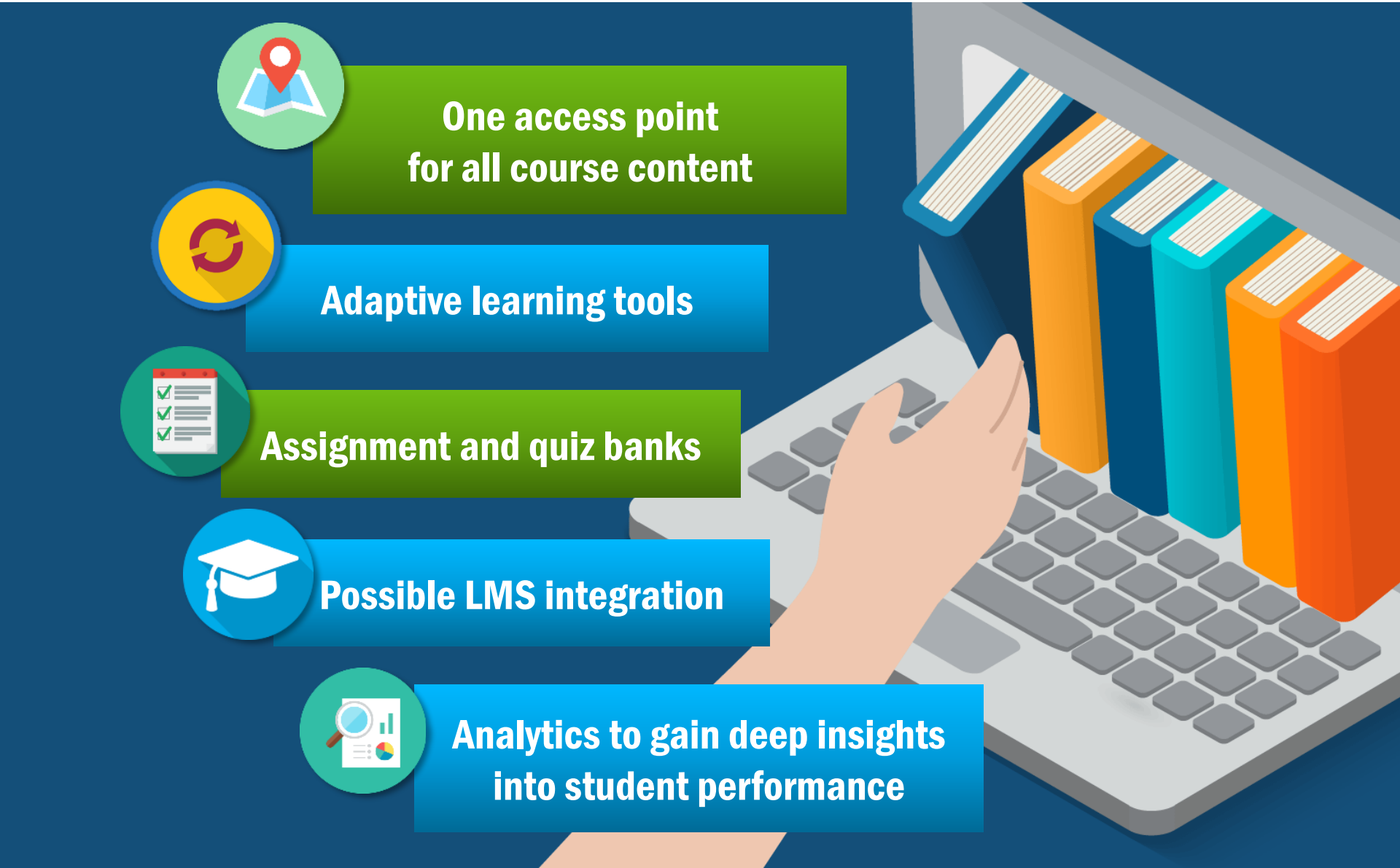




Linkedin Learning Homepage



Features of Interactive ebooks

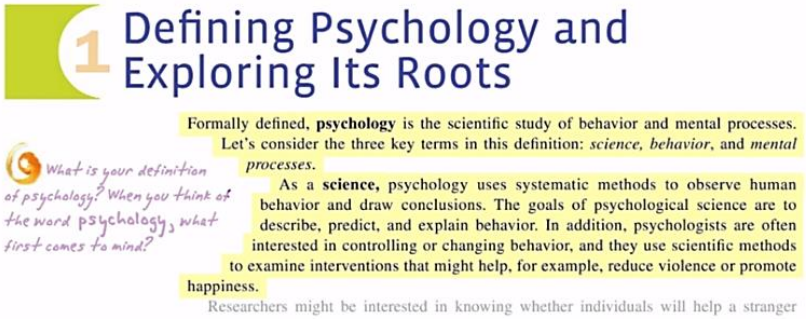


Interactive ebooks

Learning Approach

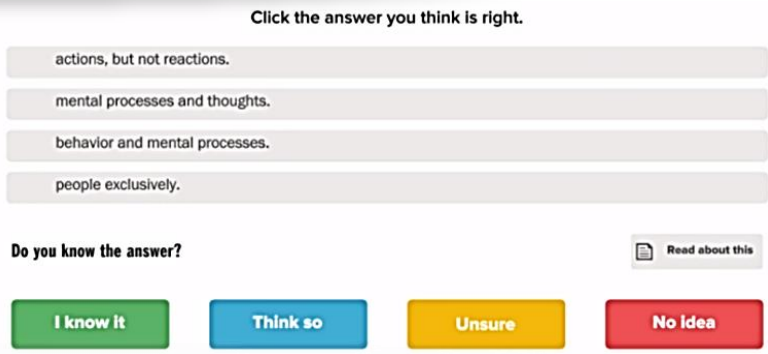
READ

Students read the material and are guided by adaptive highlighting that emphasises important topics.



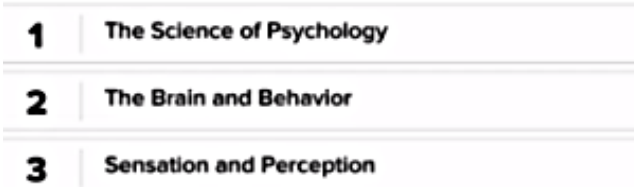
PRACTICE

As students read the material, e-book presents questions to help them make sense of what they know and don't know.

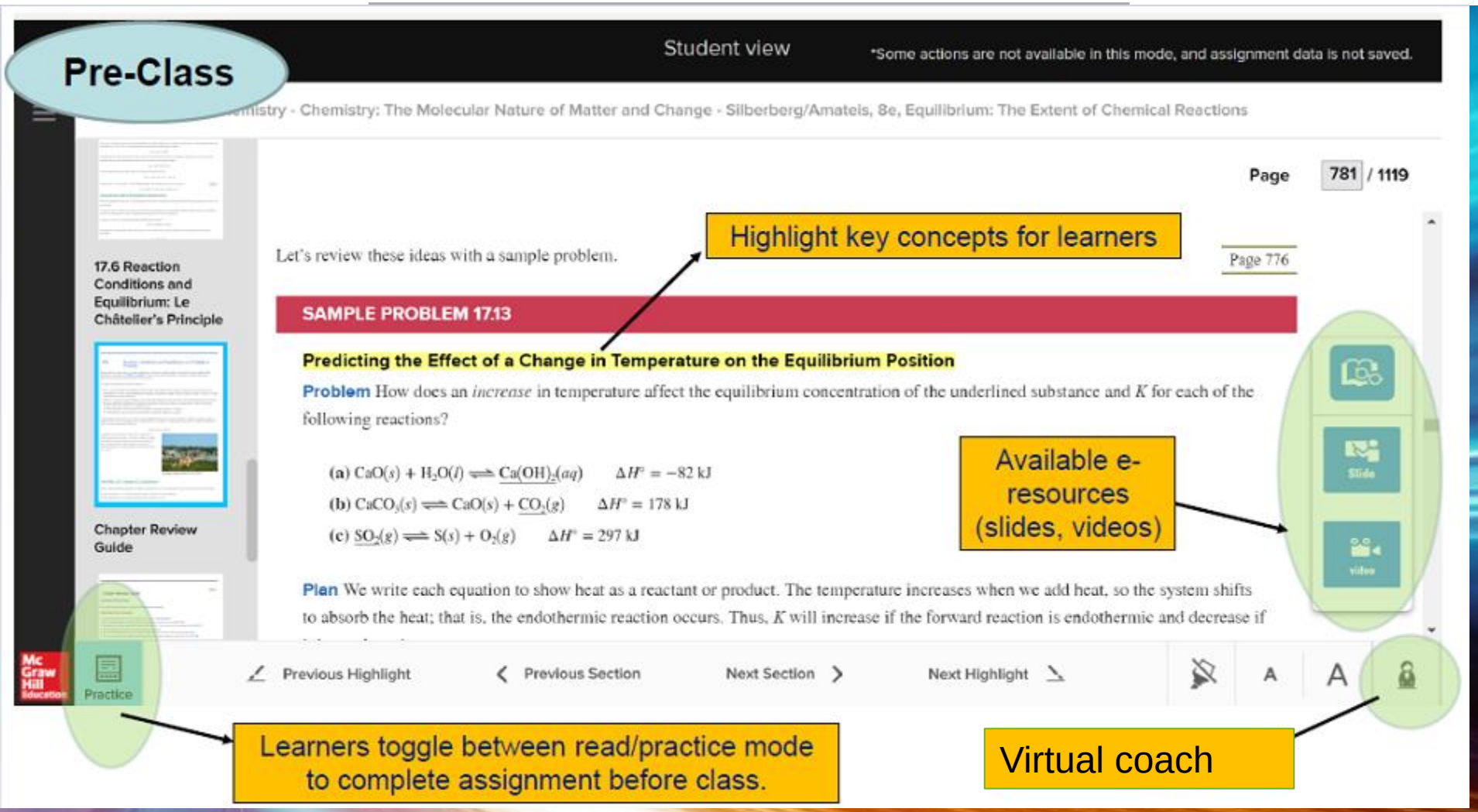


REVISE

To ensure mastery and retention, e-book directs students to revise material they're likely to forget based on analytics.



How ebook resources were curated?



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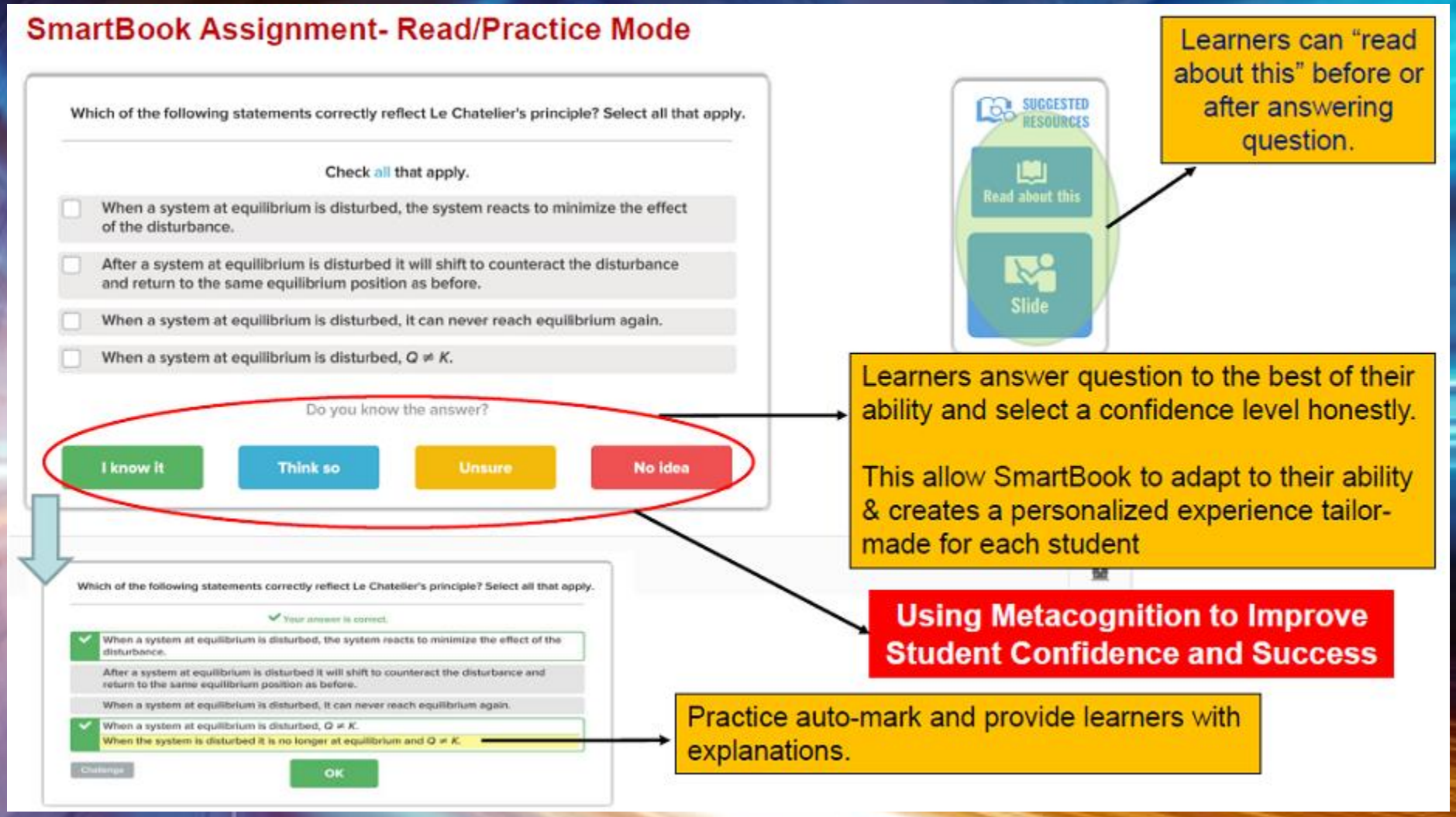
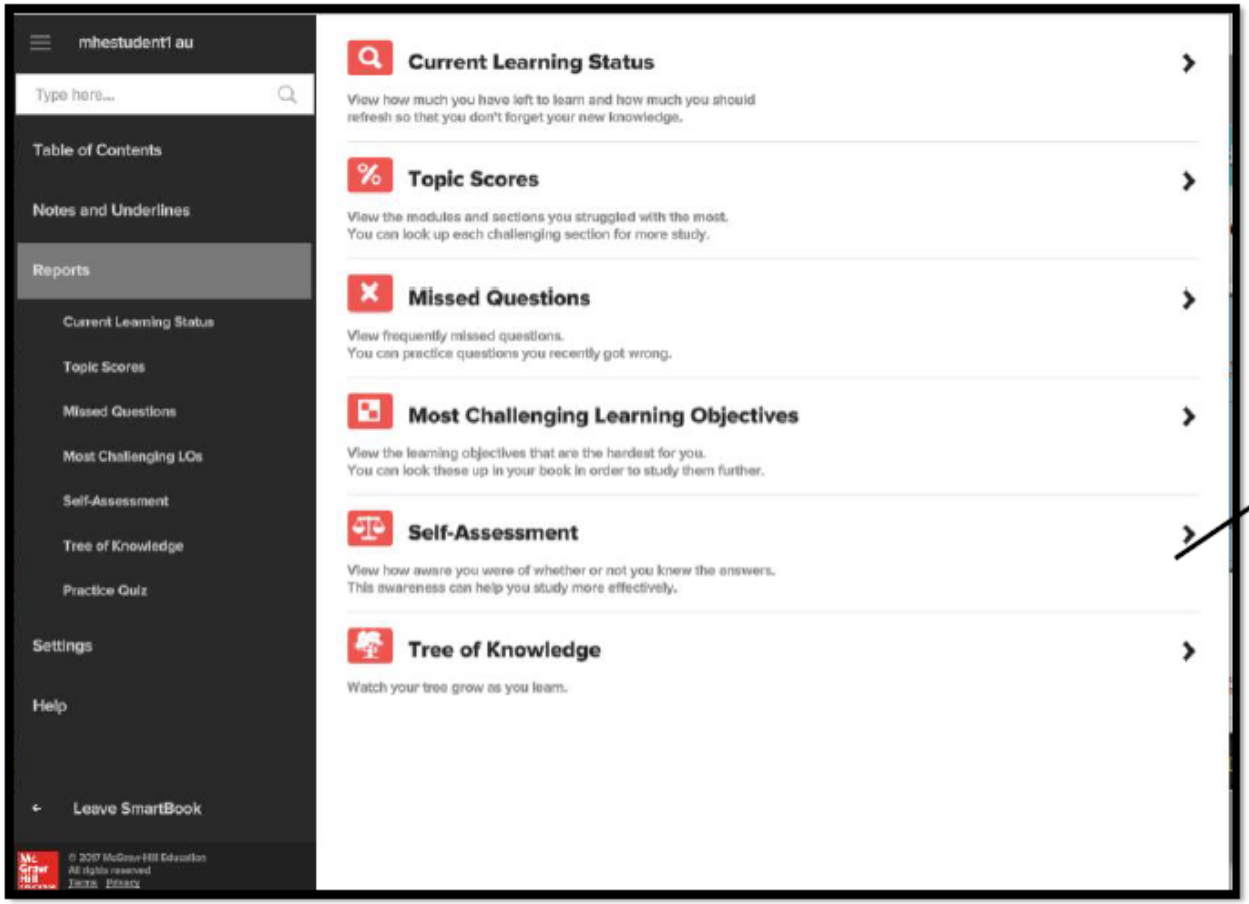


How ebook resources were curated?

SmartBook Assignment- Reports (Student's view)



Learners can use the reports to evaluate his/her performances. This will enable learners to use SmartBook more efficiently.

Report for each learner is different.

How ebook resources were curated?

Use of learning analytics to improve student performance

• **Adaptive Assignment Reports** allow instructors to review detailed reports to better measure student progress, comprehension and retention.

Progress Overview

View learner progress broken down by module.

Learner Details

View learner progress details plus completion level breakdown for each module.

Module Details

View information on how your class performed on each section of their assigned modules.

Practice quiz

This gives you a quick overview of the quizzes results for your learners.

Missed Questions

View frequently missed questions.

Metacognitive Skills

View statistics on how knowledgeable your learners are about their own comprehension and learning.

Most Challenging Learning Objectives

View the most challenging learning objectives.

Do learners really know what they think they know?
Do they know what they don't know?

How ebook resources were curated?

Using Metacognition to Improve Student Confidence and Success

Learner	Correct & aware	Correct & unaware	Incorrect & aware	Incorrect & unaware
Students' Names	61%	1%	5%	33%
	82%	0%	1%	17%
	63%	1%	4%	32%
	83%	0%	4%	13%
	80%	0%	7%	13%
	43%	6%	32%	19%
	55%	5%	14%	26%
	62%	0%	4%	34%
	6%	46%	47%	1%
	64%	0%	0%	36%
	46%	2%	2%	50%
	29%	18%	36%	17%
	64%	1%	7%	28%
	55%	0%	3%	41%
	71%	0%	5%	23%
	55%	3%	8%	34%
	67%	5%	9%	19%
	45%	1%	14%	39%
	77%	2%	4%	17%
	53%	3%	5%	40%
	75%	1%	8%	17%
	42%	1%	21%	36%
	55%	0%	3%	42%
	52%	21%	21%	6%
	51%	0%	3%	46%
	48%	1%	7%	44%
	67%	9%	8%	16%
	39%	3%	17%	42%
	31%	48%	17%	5%
	73%	0%	7%	20%

I know it | Think so

Unsure | No idea

Learner is consciously aware of her state of knowledge.
-Formulate learning strategies to improve on her weaknesses

Overconfident learner
-Tends to be careless & have lots of misconception

High achiever – He knows his stuff!!!
Empower him to lead in collaborative learning/ group discussion

High achiever with low confidence

Curate or Create?

Content Creation/Development

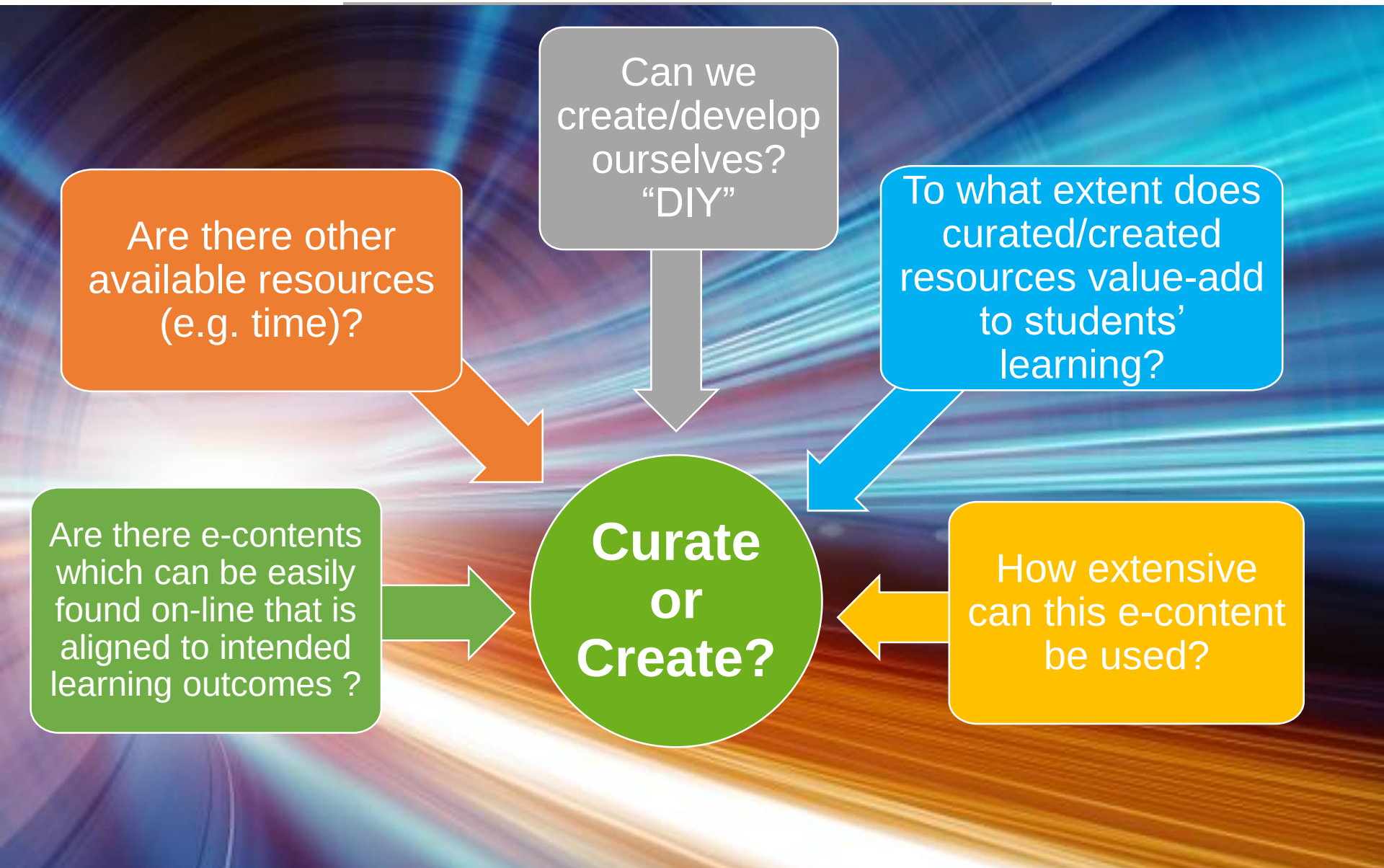
Process of developing our own content aligned to the intended learning objectives from scratch.

Content Curation

Process of gathering and organizing existing content materials that meets the intended learning objectives

FIND the BALANCE?

Content Curation vs Creation/Development



Example of a content created for self paced learning in Chemistry

Engage (5 min)

Explain / Extend & Explore (45 min)

Evaluate (10 min)

Mole Concept and Stoichiometry II

Home | Trigger | Contents | Summary | Quiz

Welcome to Lesson 07 - Mole concept and stoichiometry II

In this lesson, you will be able to:

- Construct balanced chemical equations.
- Identify the stoichiometric relationships in balanced chemical equations.
- Perform stoichiometric calculations in balanced chemical equations.

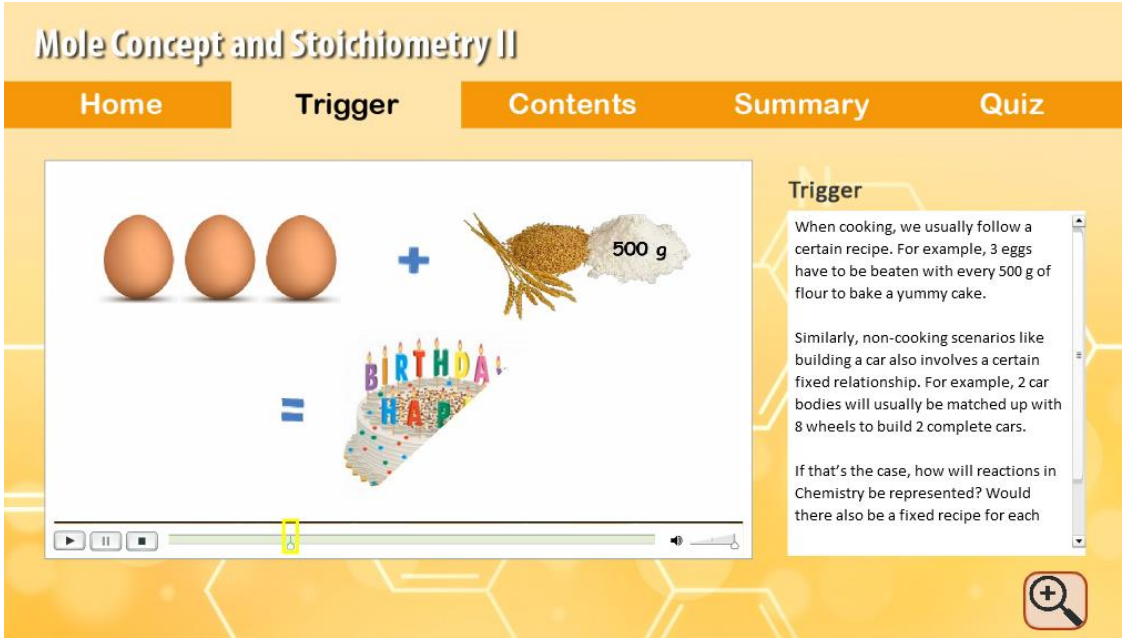
Learning Objectives

Total: 60 min

Engagement (5 min)

Phase	Time	Intended Objective	Activities
Engagement	5 min	Activate students' prior knowledge and trigger students' curiosity through questions	Topic trigger i.e. short video clip

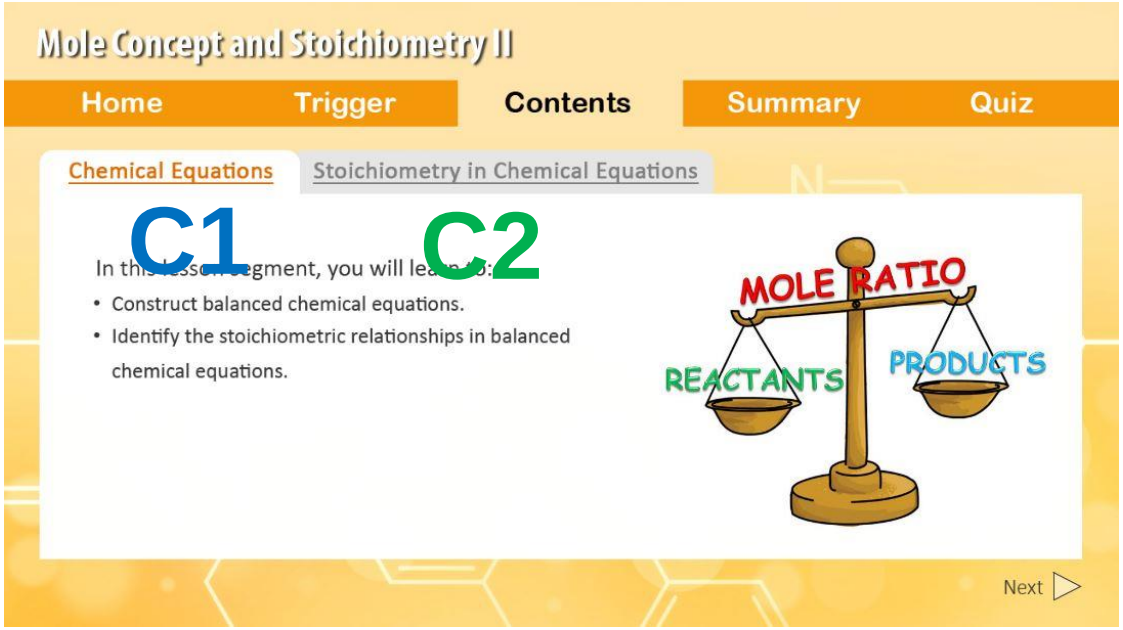
- **Topic trigger**



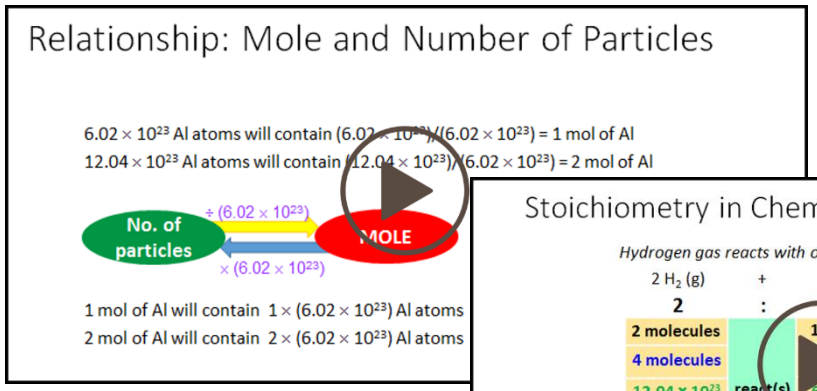
Explanation / Extension & Exploration **(45 min)**

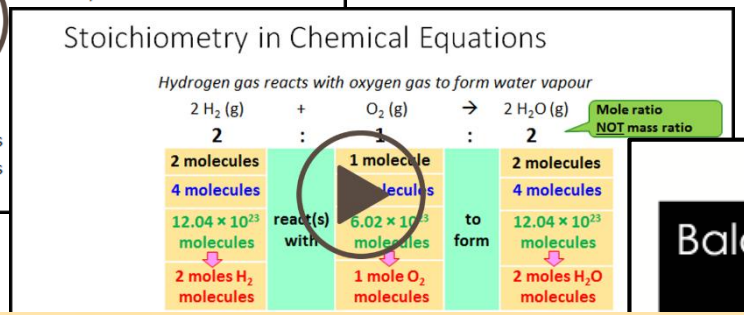
Phase	Time	Intended Objective	Activities
Explanation/ Extension & Exploration	45 min	Link to prior knowledge Introduce new concepts Extend understanding	Chunked contents, videos, activities, self-checks

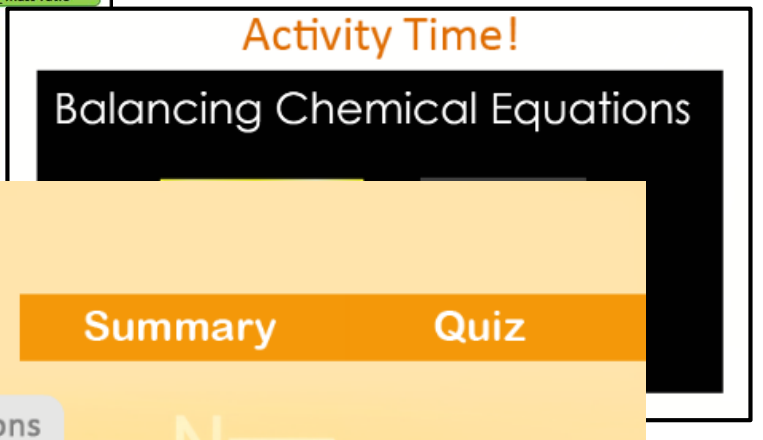
- **Bite-sized contents**

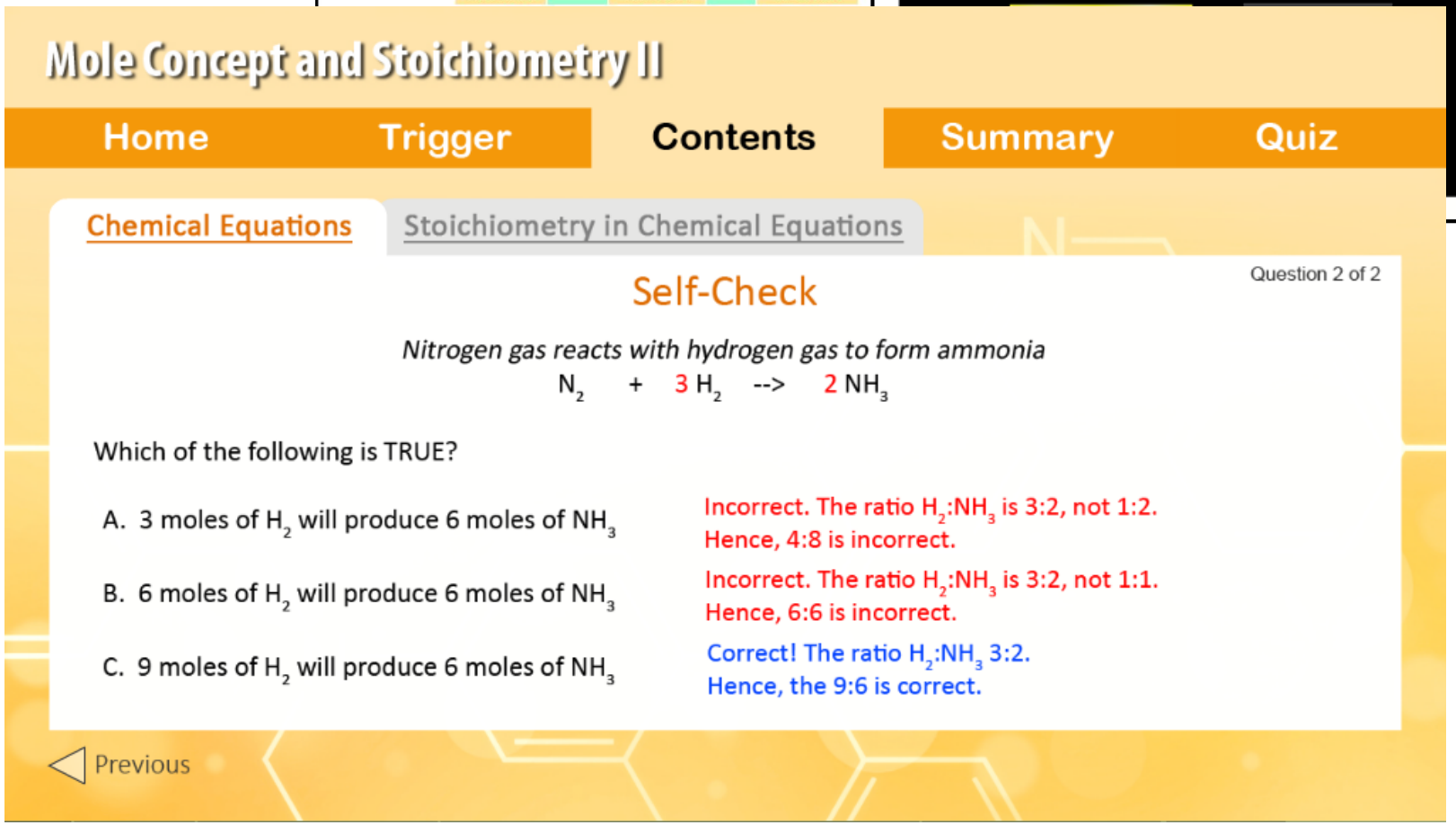


- **Videos, activities and Self-checks**





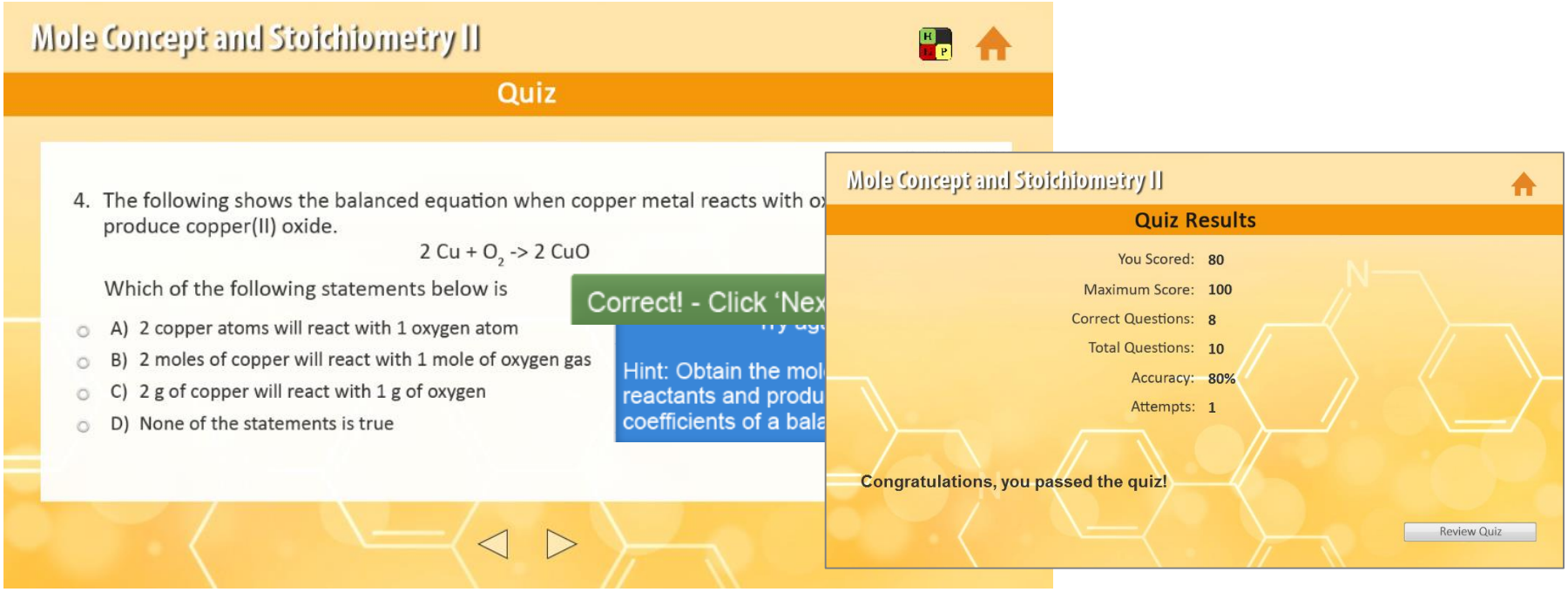




Evaluation **(10 min)**

Phase	Time	Intended Objective	Activities
Evaluate	10 min	Evaluate students' learning	Quiz (10 MCQs with hint and feedback)

- **Multiple Choice Questions (with hint and feedback)**



Software and Tools

- Videoscribe
  - Create animation video

- Screencast-O-Matic and iSpring
  - Create contents video

- Audacity
  - Edit voiceover audio files

- Microsoft Office
  - Create PowerPoint slides and Word documents

- Adobe Captivate
  - Convert to SCORM-compliant packages

Challenges Faced

NO…

Something new?

Nehhh..!!

NO COPYRIGHT !

images

… in storyboarding

… in animation and e-learning authoring tools

Content Development
(Man-hours per 1-hr Learning Package)

- Storyboarding — 4 × 3 hrs = 12 hrs
- Voiceover Script — 4 × 2 hrs = 8 hrs
- Voice recording — 4 × 1 hrs = 4 hrs
- Animations — 4 × 1 hrs = 40 hrs

- Activity — 1 × 1 hrs = 1 hrs
- Quiz — 1 × 2 hrs = 2 hrs

- SCORM conversion — 1 × 4 hrs = 4 hrs

≈ 9 work days

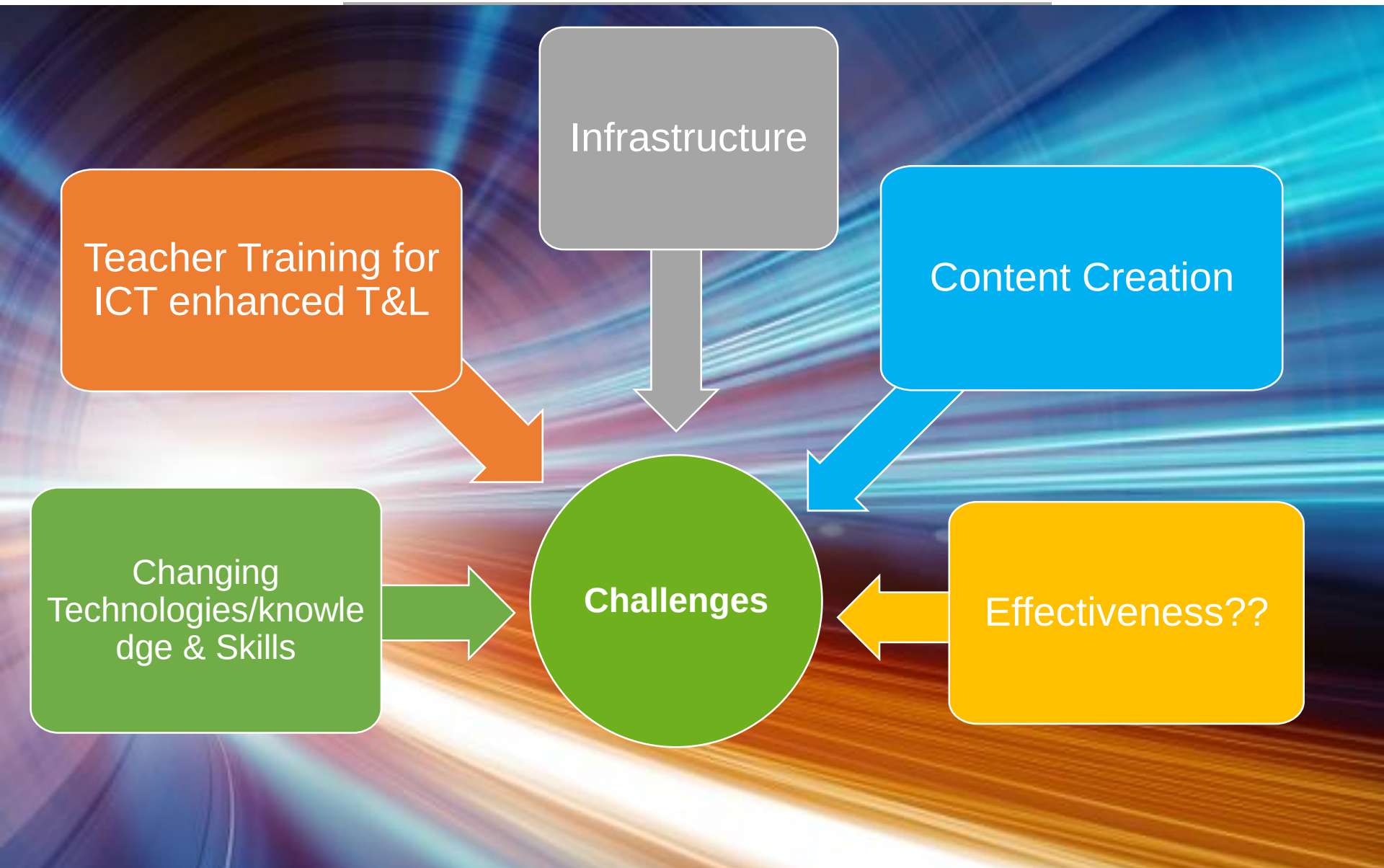
NOTE: Man-hours based on **steady-state content** development (i.e. excludes software familiarization/troubleshooting, user-interface development etc.)

Approx. 71 hrs

Building Digital Competencies for Educators

Curriculum Design and Develop-ment	Design curriculum that helps learners achieve learning outcomes based on sound pedagogy	Identify and plan appropriate digital resources (e.g. YouTube) and tools that match learning preference and help achieve learning outcomes.
Facilitation of Learning	Facilitate ICT-enhanced interactions (e.g. learner-content, learner-learner or learner-lecturer interactions) to support engagement and learning, based on sound pedagogy.	Timely use of poll questions to determine learners' prior knowledge before using the discussion forum in LMS.
Assessment for and of learning	Use ICT to enhance assessment tasks appropriate to the learning outcomes.	Set up and use auto-marking features in LMS and auto-plagiarism check for online assessment.
Reflective Practitioners	Engage in continuous professional development (PD) to develop IETL competencies.	Identify and participate in various PD related to specific domains (e.g. curriculum design) to deepen competencies.

For thoughts??



Thank You