Nine things Autonomous Learners Do Differently: A story in four chapters

Professor Allison Littlejohn
Open University, UK
@allisonl
Learning processes

Learning

Work practices

Technology Use

Littlejohn & Margaryan (2013), Technology-enhanced Professional Learning, Routledge: NY
Based on Eraut (2000 & 2004)
Self-regulated learning (SRL)

SRL: self-generated thoughts, feelings and actions that are planned and cyclically adapted to the attainment of personal learning goals.

(Zimmermann, 2005)
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SRL Factors
self-efficacy
goal-setting
task strategy
learning strategy
help-seeking
self-satisfaction & evaluation
task interest
learning challenge
F1 Self-efficacy  F2 Goal Setting  F3 Task Interest Value  P1 Task strategies etc.  P2 Help-seeking  P3 Interest Enhancement  SR1 Self-evaluation  SR2 Self-satisfaction
answer questions
receive feedback (relative to others)

-2.00
-1.50
-1.00
-0.50
0.00
0.50
1.00
1.50
2.00

F1 Self-efficacy
F2 Goal Setting
F3 Task Interest
P1 Task
P2 Help-seeking
P3 Interest
SR1 Self...
SR2 Self...
What factors should we consider to encourage learner autonomy?
CONTEXT COUNTS
Context

Coursera & University of Washington

40,000 registered learners

Oct 14- Dec 14

Method/instruments/ sample

MOOC SRL questionnaire

Contacted by announcement in week 2 (of 8)

788 responses from 79 countries

303 professionals, 141 students, 59 both, 285 neither

Follow up interviews of 30 learners
Introduction to Data Science

Join the data revolution. Companies are searching for data scientists. This specialized field demands multiple skills not easy to obtain through conventional curricula. Introduce yourself to the basics of data science and leave armed with practical experience extracting value from big data. #uwdatasci

About the Course

Commerce and research are being transformed by data-driven discovery and prediction. Skills required for data analytics at massive levels – scalable data management on and off the cloud, parallel algorithms, statistical modeling, and proficiency with a complex ecosystem of tools and platforms – span a variety of disciplines and are not easy to obtain through conventional curricula. Tour the basic techniques of data science, including both SQL and NoSQL solutions for massive data management (e.g., MapReduce and contemporaries), algorithms for data mining (e.g., clustering and association rule mining), and basic statistical modeling (e.g., linear and non-linear regression).

Course Syllabus

Part 0: Introduction

- Examples; data science articulated, history and context, technology landscape

Part 1: Data Manipulation at Scale

- Databases and the relational algebra
- Parallel databases, parallel query processing, in-database analytics
- MapReduce, Hadoop, relationship to databases, algorithms, extensions, languages
- Key-value stores and NoSQL: tradeoffs of SQL and NoSQL

Sessions

Jun 30, 2014 - Sep 10th 2014

Go to Course

Course at a Glance

- 8 weeks of study
- 10-12 hours/week of work / week
- English

Instructors

Bill Howe
University of Washington

Categories

Information, Tech & Design
Computer Science: Systems & Security
Computer Science: Software Engineering
What goes around comes around

- Pre-2004: commercial RDBMS, some open source
- 2004 Dean et al. MapReduce
- 2008 Hadoop 0.17 release
- 2008 Olston et al. Pig: Relational Algebra on Hadoop
- 2008 DryadLINQ: Relational Algebra in a Hadoop-like system
- 2009 Thusoo et al. HIVE: SQL on Hadoop
- 2009 Hbase: Indexing for Hadoop
- 2010 Dietrich et al. Schemas and Indexing for Hadoop
- 2012 Transactions in HBase (plus VoltDB, other NewSQL systems)

- But also some permanent contributions:
  - Fault tolerance
  - Schema-on-Read
  - User-defined functions that don’t suck
# Data Science Examples

Post your favorite data science examples from around the web -- even better if you made it yourself! Please read our forum posting policies before posting or starting a new thread.

## All Threads

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<th>Thread Name</th>
<th>Points</th>
<th>Posts</th>
<th>Views</th>
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</thead>
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<td>Chef Watson with Bon Appetit - Big Data in the Kitchen</td>
<td>9</td>
<td>4</td>
<td>712</td>
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<tr>
<td>Started by Neill White · Last post by Tejas Khot (2 months ago)</td>
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<td>Free Datasets</td>
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<td>Started by Anonymous · Last post by Mohan Radhakrishnan (4 months ago)</td>
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<td>Tableau Data Visualization Examples</td>
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<tr>
<td>Started by Tash Bickley · Last post by Duong Hoang Linh (5 months ago)</td>
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<td>NodeXL - Network Overview for Discovery and Exploration in Excel</td>
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<td>Seeking Real World Examples - Or ideas on making them</td>
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<td>Started by John Ligda · Last post by Fu-chieh Chang (5 months ago)</td>
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SRL Profile Survey Instrument

- 42 items measuring 11 sub-processes of SRL.
- Based on a validated instrument exploring SRL behaviours in professional learning.
- [http://figshare.com/articles/SRLMQ/866774](http://figshare.com/articles/SRLMQ/866774)

- My past experiences prepare me well for new learning challenges. *(self-efficacy)*
- I try to apply my previous experience when learning. *(elaboration)*
- I ask myself how what I am learning is related to what I already know. *(task strategies)*
- I ask others for more information when I need it. *(help-seeking)*
- I try to understand how what I have learned impacts my work/practice. *(self-satisfaction)*
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Open, networked structure.

Announcement of current activities, and hashtag links to help learners connect.
Active learners set goals & structure their learning

Passive learners expect others to provide structure

Lurkers are invisible to other learners….
Active (12/29)

“Oh there’s some people who are everywhere you turn in the Change 11 MOOC: there’s this group of people who are inspirational, just phenomenal the way they just keep going and they know their way around it.” (P08).

“You can read the comments of people who are participating from different places and they give links to things that they are doing or they think while you hear what is happening” (P20).

“I have no idea how scattered I am across this MOOC, I have no idea how many contributions I’ve made, 30? 50? I’ve got a lot of replies… I usually end a reply on an open end” (P05).
Lurkers (13/29)

“I guess I tend to be a loner and I’ve done more lurking & I'm quite happy lurking, I think it’s an honourable profession” (P21)

“Lurking is actually hugely beneficial [knowledge is filtered by the course organisers and has] more value than something I randomly come across on the Internet” (P18)

“I'm going out to the MOOC and lurking and getting lots of great interesting ideas [to my] networks” (P01).

“I’m more or less like what do you call? A lurker and not very active … I'm always invisible and the reason is that the way I’ve been using the MOOC is to put into things that I'm doing… to be a network mentor” (P17).
“Sure, I can read other people’s blogs and that’s not a problem and I comment occasionally, but as far as really putting my ideas out there in the open in my own blog to be trampled on, you know there’s a bit of fear there I think that I have and so that has been difficult for me” (P12).

"I'm not really sure how to find a group of people online who really want to learn about what I most want to learn about.” (P13).
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MOOC Multiplicity of contexts

- We have identified factors influencing student/professional learning in MOOCs
- Why is there a difference?


MOTIVATION MATTERS
Introduction To Data Science

Context: University of Washington.

40,000 registered learners

Period: Oct 14 - Dec 14

Data re-analysis Jan 15 - Mar 15

Method/instruments/sampling: Semi-structured interviews (35)

Contacted by announcement in week 2 (of 8)

http://www.gcu.ac.uk/academy/
Task-interest & value:

Recognition that the course is valuable not only for extrinsic rewards (eg certificate), but for. Intrinsic gains (eg expanding knowledge).
“This class motivated me to do whatever was required to get the certificate … When I first took the course I thought I would use the course certificate and whatnot to add to my LinkedIn profile. I did do that” (LSRL, 783)

“So now it’s got to the stage where I am prioritising courses that offer certificates” (LSRL, 236).
HSRL motivations tended to be linked to work performance or personal interest:

“The most important factor because maybe it’s not even how much I learn, but **how big the impact of my work can be to the outside world**” (HSRL, 119)

“Getting the **certification of completion is less important in the end**, it’s nice in the short term, but I think it’s the artefacts that are left over that is a measure of achievement” (HSRL, 135).
Goal-setting: 
The aim(s) for learning and performance outcomes from the course.

Self-evaluation: 
Comparison of self-observed performance against some standard,

Self-satisfaction: 
Perceptions of satisfaction with one's own performance and reaching specific objectives.
HSRL tend to link learning goals with work:

We’ve got a contract with the health service … so they’re trying to move all our skills into a different area. We’ve been encouraged to learn a new database technology like NoSQL, analytics and so **this course just fitted that learning requirement.** (HSRL, 481)

And are more strategic about where they focus effort:

“The way to approach it [learning] is to follow what interests me and not worry too much about trying to keep a complete overview of the area… I plan to complete all of the assignments [but] I won’t be too worried if I don’t.” (HSRL, 428)
HSRL self-evaluate against their own benchmarks:

“I allow myself the flexibility to say if I go down a different path then that’s fine” (HSRL, 492).

“I’ve always been someone who fundamentally has to understand what I’ve learnt rather than just recount it” (HSRL 543).
HSRL can identify progress in relation to intended aims, which may impact learner satisfaction:

“I’m… very satisfied with what I did during the course and what I’ve got out it at the end.” (HSRL, 247)

“Well now I’m feeling more powerful, I can do some things, I am confident in finding solutions for problems that are too big for me right now” (HSRL, 670).
By contrast LSRL take a different approach:

“Ok my main aim is to broaden my knowledge, **hopefully this will be useful in my career**” (LSRL, 603).

*Did you set goals?* "No not really"

*Did you have a goal in mind?* "I suppose really my goal was to **complete the course**". (LSRL 256).
Self-evaluation more challenging for LSRL:

“It’s hard for me to gauge how much I’ve understood something… sometimes we have a blindness about it ourselves” (LSRL, 236)

“Yeah that’s a difficult question because I don’t perceive my own learning” (LSRL, 396).

Impacts learning (task) strategies…
Task-strategies: Ways in which learners approach learning and performance by reducing a task to its essential components and reorganizing these parts meaningfully.

Monitoring, changing, adapting strategies is key.
LSRL tend to try to carry out all (or most) activities:

“Yes my goal is definitely to **watch all the videos** and the content provided and try **to solve all the assignments**, although not necessarily I will try to take part in the additional optional assignments” (LSRL, 603).
LSRL tend to try to carry out all (or most) activities:

“Yes my goal is definitely to watch all the videos and the content provided and try to solve all the assignments, although not necessarily I will try to take part in the additional optional assignments” (LSRL, 603).

In contrast to HSRL who tend to be strategic about where they focus effort:

“Aspects of it [the MOOC]. Carefully curated parts. So not as a whole, I’m going to be picking through what nuggets are of use to me in particular contexts” (HSRL 505).
Help-seeking:
Engaging with other people from personal and/or professional networks. Seeking out external resources to find solutions to a challenge.

Recognition of limits of one's own knowledge is key.
LSRL use the course forums as well as useful social networks used by other MOOC participants:

“When assignments are difficult it does help to have discussion forums just to look for answers, even if I don’t necessarily need to have active interaction” (LSRL, 291)

“Also I’ve gone to the forum to read, I don’t tend to ask questions on the forum so much, but I do read answers to questions that I have and that people have answered. So I’ve gone to get information there as well” (LSRL, 495).

“My first solution was always searching with Google and I use Stack Overflow or other sites or the Google Python academy or other resources” (LSRL, 215).
HSRL gave more example of drawing on professional networks for help:

“I ask people at work because we’ve got some IT people here, so when I have a problem I just go and ask them” (HSRL, 239).

“Yeah I kind of built my own network with my colleagues and they were also annoyed by some of the questions, we were discussing that” (HSRL, 247)

“With my colleagues here, so for the statistical problem for example that it’s a big thing, all 3 of us are here trying to figure out how to work with that. So we came to the company 3 Saturdays to work on the problem together” (HSRL, 370).

24,000 registered learners

Period: Nov 13-Apr 14

Method/instruments/sample: psychometric Questionnaire (350) & semi-structured interviews (30)

350 learners in study, contacted by announcement in week 5 (of 14)

http://www.gcu.ac.uk/academy/pl-mooc/
But the disadvantage of this is we actually aren't going to know which component of that composite endpoint is primarily driving a relationship that is seen.

So in other words, if I see a benefit on total cardiovascular events, I don't know whether that's because there's a benefit on myocardial infarction, a benefit on stroke, a benefit of cardiovascular death, a benefit on all of them.

So in other words, is this endpoint being driven by one of the components or is there a benefit on all of them?
CHAPTER 6

Blinding and Placebos

In any randomized trial the comparison of treatments may be distorted if the patient himself and those responsible for treatment and evaluation know which treatment is being used. This problem can sometimes be avoided by making the trial double-blind, whereby neither patient, physician nor evaluator is aware of which treatment the patient is receiving. The reasons for introducing blinding are discussed in section 6.1. In particular, the role of placebo for control patients not on active treatment is discussed. Section 6.2 describes how double-blind studies are actually carried out. It is often infeasible to conduct a double-blind trial so that in section 6.3 I consider some guidelines as to when blinding is practicable. The role of partially blinded studies (e.g. blinded evaluators only) is also discussed.

6.1 THE JUSTIFICATION FOR DOUBLE-BLIND TRIALS

In chapter 4 I emphasized the need for a randomized control group when evaluating a new therapy. One might think that the correct use of randomization guarantees an unbiased clinical trial, but in fact there remain many possible sources of bias to be mentioned in this and subsequent chapters. Here we consider the potential bias that can occur if everyone involved in a trial is aware of which treatment each patient is receiving. In this respect there are three main participants to consider: the patient, the treatment team and the evaluator.

1) The patient If the patient knows he is receiving a new treatment this may be of psychological benefit. In contrast, the patient knowing he is on standard treatment (or no treatment if there is no effective standard) may react unfavourably especially if he is aware that other patients are ‘privileged’ to receive a new therapy. The reverse psychological effect could apply to some patients who feel more assured when on standard therapy. Such a patient’s attitude towards his therapy may affect his cooperation in the study (e.g. compliance with intended therapy, attendance for evaluation) and may also influence how the patient responds.

The impact that full therapy information can make on patient responses will
Discussion forum encourages in-depth discussion.

Obscuration by existing treatments?

Incentive Placebo-Controlled trials Vs. Value and Favorable risk benefit ratio?

Dr. Truog's Response to Gelsinger Case

Dr. Truog's Response to the TGN1412 Case

help course participants interested in participating in a study about regulating your own learning, please read this post!

Helpful tip for those experiencing issues with downloading videos

Aftermath of Gelsinger's Death

Preventable Death

"...his ammonia levels were above the range for inclusion but he was given the dose regardless."

Gelsinger Gene Therapy Trial

Jessie was put deliberately at undue risk

---

xparedes

about a month ago

I know that Placebo is the first choice but under some conditions it is unethical to use it like in oncology setting therefore you must use the gold standard to compare. One arm gold standard (specific for instance) to the other arm (drug to be tested with or w/o gold standard). Best

I think that the only benefit of placebo-based trial is that you can do a comparison between two groups. The group that receive the "new treatment" and the control group. You can think that is unethical don't give the treatment to a control group. But sometimes the control group are health people that don't need any treatment.

---posted about a month ago by rafaelarmijo

I think it depends on the research question you are looking at. Only a placebo controlled study can really tell u the exact efficacy compared to not treating that patient at all. On the other side, when we compare with the existing therapy, some disadvantages of the existing therapy can lead to false interpretation of the new drug being better when it is actually not. One can counter this by having multiple arms: placebo, existing therapy, new drug and even combination of new and old drug. The problem with this is that a large sample size is required.

---posted about a month ago by vishnuvy

I think the appropriate use of placebo is dependent on the study. I'm guessing the magnitude of the placebo effect is much larger in a clinical trial for an antidepressant than it is for an oncology drug. What about the subject who is randomized to receive placebo and is also poorly compliant? Will there be a difference in magnitude in the placebo effect between compliant and non-compliant subjects?

---posted about a month ago by lcohen1999
MULTIPLE CHOICE  (1 point possible)

Hemoglobin A1c is a blood test that helps to determine the average glucose level of a patient with diabetes over the prior 3 months. In a trial designed to determine if a new diabetes treatment lowers cardiovascular death, the authors chose to measure hemoglobin A1c levels as one of their outcome measures. What type of outcome measure is hemoglobin A1c?

- Hard endpoint
- Soft endpoint
- Surrogate endpoint
- Composite endpoint

You have used 0 of 3 submissions

MULTIPLE CHOICE  (1 point possible)

Investigators conducted a randomized trial to evaluate the effect on pain of nurses removing an adhesive bandage either quickly (“fast removal”) or slowly (“slow removal”) among young healthy adults without wounds. The pain outcome was assessed using a validated Likert-type scale (0-9, from no pain to the worst pain imaginable).
Task-interest & value:

Recognition that the course is valuable not only for extrinsic rewards (e.g., certificate), but for intrinsic gains (e.g., expanding knowledge).
HSRL and LSRL tend to focus on gaining certificate. Influences goal-setting & learning (task) strategies:

- [My aim was to gain] ‘the certificate, yes, although I don’t really need it, but I go for it”…

[My goal was] ”to attend all the lectures. Not so much to participate in the forum although I do. I read things, I don’t write so much.” (LSRL, 22)
LSRL tended follow the course ‘pathway’:

“I do **download the study material** which is provided by the course website, but while I **watch the video** I do not have a habit of making notes and I am a person who is organised in a mess. So even if I make a note I don’t recollect and read those notes.” (LSRL, 295)

“I’ve tried to **go through the questions** first and then go back and **review the text** to see…and that forces me to kind of focus on the topics a little bit more as opposed to if I go to the lecture and then try to do the questions I find myself zoning out during it.” (LSRL, 360)
HSRL more strategic in how they focus their time:

“I don’t put too much effort into what I'm learning, but this course – looking at the videos I get to take my time to understand. Sometimes I watch the video twice, which has really helped me to have a better understanding when I'm learning.” (HSRL, 284)
<table>
<thead>
<tr>
<th></th>
<th>Nine things autonomous learners do differently</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Have the confidence &amp; motivation to decide their own learning pathway</td>
</tr>
<tr>
<td>2</td>
<td>Consider what they want to achieve and plan appropriately</td>
</tr>
<tr>
<td>3</td>
<td>Set and adapt learning goals</td>
</tr>
<tr>
<td>4</td>
<td>Think critically relate their learning to other potential areas of application in the future</td>
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<tr>
<td>5</td>
<td>Have a wide repertoire of learning approaches to draw upon as appropriate</td>
</tr>
<tr>
<td>6</td>
<td>Actively seek help from elsewhere</td>
</tr>
<tr>
<td>7</td>
<td>Compare their own performance against others outside the immediate context</td>
</tr>
<tr>
<td>8</td>
<td>Experience a sense of achievement when they learn</td>
</tr>
<tr>
<td>9</td>
<td>Persist in learning when facing challenges</td>
</tr>
</tbody>
</table>
The ideal MOOCer?

- Highly self-regulated MOOCers follow their own aims and pathways.
- These pathways are influenced by context (i.e., whether the goal is gaining a grade or learning a concept – or simply networking).


INTEGRATE TO INNOVATE
Intentional Innovation
Erasmus+ ExplOERer

RQ How do Educators Learn Open Educational Practice?

Theory: Expertise Development and Integrative Pedagogy (Tynjälä, 2009)

Method:
1 Psychometric survey instrument (n=521) measured self-perceptions of learning & workplace autonomy
2 Semi structured interviews (n=30)

Timescale: January – April 2015
http://www.exploerer.gu.se/

Starting point: limited use of OER

Resource use

Resource evaluation

Knowledge development
Type 1 • General theoretical knowledge
Type 2 • Specific theoretical knowledge
Type 3 • Practical/experiential knowledge
Type 4 • Self-regulative knowledge
Type 5 • Community based socio-cultural knowledge
Type 6 • Workplace based socio-cultural knowledge
Towards the ideal MOOC?

- Integrate professional learning with practice
- BUT be aware of the constraints


Littlejohn, A. & Hood, N. (2016) Knowledge typologies for professional learning: educators’ (re)generation of knowledge when learning open educational practice, *Learning Media & Technology* [impact factor 1.569]
PRACTICE PERSISTS
MOOC Quality Study

**MOOCQ Commonwealth for Learning**

*Delphi survey 1* Distributed online survey (Survey Monkey) to 60 experts (names identified from the literature and grey literature). 27/60 responses.

*Follow up focus group with* 17 experts KL, Malaysia, May 2-3 2016.

**Timescale:** Nov 2015 – May 2016
Purpose

- To enable learning about a specific topic (eg WW1 History)
- To support professional skills development (eg Midwifery)
- To raise public awareness (eg Towards Brexit? MOOC)
- To influence public opinion
- etc

Quality Measure

- Presage variables
- Process variables
- Product variables

Impact

- Quality measurement privileges a perspective
Government Perspective

Define the purpose
State the intended change(s) and attach evaluation of MOOC to the change(s)

Purpose
- Knowledge
- Skills/Practice
- Brand/Promotion

Type of measure
- Presage
- Process
- Product

Examples
- Zika Virus MOOC
  1. Creation/validation process
  2. Measurements for total people and demographics
  3. Accessibility process for language
  4. Summative evaluation mechanism

- Midwifery MOOC
  1. Evaluation process for tutors
  2. Measurement for specific people interacting
  3. Formative evaluation mechanism
  4. Impact in 5 years

- Higgs Boson MOOC
  1. Impact assessment from participants
  2. Measurement system for impact
  3. Message controlling mechanism
  4. Learner perspective change pre/post
## Institution Perspective

### Presage Dimensions
- Identify & articulate purpose for MOOC/s
- Identify KPIs for purpose
- Identify required resources: material; human; & technological
- Cross-alignment with other activity
- High quality instructional design
- Develop evaluation plan

### Process Dimensions
- Monitor learning activity
- Ensure moderation and continuous improvement process
- Ongoing support and guidance for staff

### Product Dimensions
- Collect KPI data and report to stakeholders
- Perform SWOT analysis
- Review presage stage and revise as necessary
Institution Perspective

**PRESAGE DIMENSIONS**
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**PRODUCT DIMENSIONS**
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- Perform SWOT analysis
- Review presage stage and revise as necessary
**Stakeholder**

**Purpose/goal/motivation**

- Career advancement
  - Achieve certificate
  - Find new position
  - Build network

- New/additional knowledge
  - Align with interest
  - Self satisfaction
  - Self actualisation

- Earn a certificate/qualification
  - Course offers a certificate
  - Align with curriculum

- Part-time study

- Meet new people/social capital
  - Social networking

**Measures of means**

- **Career advancement**
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  - Find new position
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**Measures**

- **Path to employment** (e.g. company uses MOOC for recruitment)
  - Building up resume
  - New competencies

- **Access to community of practice**
  - Knowledge-sharing opportunities

- **Recognised certificate**

- **Wide selection**
  - Flexible entry
  - Minimal cost

- **Large number of learners**
  - Opportunities for socialisation
To support learner autonomy

Find ways to make use of the emerging multiplicity of contexts & motivations.

Integrate formal learning within a broad range of activities.

And change practice to view quality from the learner perspective.


Nine things Autonomous Learners Do Differently

Professor Allison Littlejohn
Open University, UK
@allisonl