# Five Common Misconceptions about Learning (5 conceptions erronées courantes sur l'apprentissage)

- Traduction par Françoise Appy, Form@PEx, 28 mai 2019

# Five Common Misconceptions about Learning (texte original de Greg Ashman)

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There are many books out there that deal with education myths. Daisy Christodoulou's "Seven Myths about Education" is excellent and I have recently been sent "Urban Myths about Learning and Education" by De Bruyckere, Kirschner and Hulshof which I will review when I have finished reading it.

However, in this necessarily brief post I am going to characterise some common ideas as misconceptions rather than as myths. To me, this is how such views often present themselves; they are plausible, a wide range of people seem to arrive at them independently and yet the available evidence suggests that they are flawed. They feel 'truthy' in much the same way that it seems reasonable that something must be pushing the Moon around the Earth.

## 1. Novices should emulate the behaviour of experts

This misconception has legs. It is a key driver behind inquiry-based programmes in science, mathematics and history. For instance, in an article in The Telegraph, Jo Boaler contrasts the work of a PhD mathematics student with the sort of maths that takes place in classrooms, finding the latter wanting. But why should children who are just embarking on their mathematical journey need the same kind of learning experiences as someone much more expert? Experts have a vast amount of content knowledge that enables them to perform differently. It is easy to underestimate the scale of this. A key finding of cognitive science is that experts and novices benefit from quite different types of instruction.

If you ask a history student to read a source document then at least you are replicating the actual behaviour of experts. This may not be optimal for learning but it could have value as part of a range of strategies – students might enjoy it, perhaps. However, some strategies that are supposed to be based upon the behaviour of experts might not even reflect what experts do. For instance, the use of multiple cues or "searchlights" in reading instruction is meant to reflect experts' strategies but it is unclear whether expert readers actually use these cues.

## 2. You understand concepts better if you discover them for yourself

I recently fixed the toilet. It was a frustrating experience because I didn't know what I was doing. There was lots of cursing and plenty of, 'what does this bit do?' I spent at least the next week wondering whether an eruption of soiled water was imminent. Do I now understand toilets better than if a plumber had been alongside me, explaining exactly what to do? Definitely not.

So why do we have this intuitive preference for students figuring things out for themselves? In one seminal study, students were randomly divided into two groups. The first group were explicitly instructed in the fundamental scientific principle of controlling variables. The second group were given investigations to complete in which they had to figure out this concept for themselves. Unsurprisingly, fewer students in the second condition learnt the principle. However, those that did were *no better* than students from the first group at later evaluating science fair posters. There was no advantage to discovery.

Nowadays, advocates of student discovery tend to promote the less ambitious idea of 'productive failure'. They concede that explicit instruction is needed but only after a period of open-ended problem solving. Interestingly, given the above discussion, it has been argued that many of the experiments that have been designed to test this idea fail to properly control variables (see the discussion at the end of this paper). A 2014 study by Manu Kapur is the best quality study so far but there is still a problem with it: The students given explicit instruction prior to problem solving then have to spend a whole hour solving a single problem which they already know how to solve.

## 3. Meta-cognition is a short-cut to expertise

So if simply imitating the behaviour of an expert will not make you an expert, are there other shortcuts available? Clearly, it would be great if we could find a way to develop expertise without students having to learn and practice all of the boring stuff. Perhaps we can teach general strategies which, if our students apply them, can be used in a range of situations. This way, we can teach them 'how to learn' and they can apply this to anything they need to learn in the future.

The picture here is actually quite complex. Take the example of reading comprehension strategies. These are general strategies that you can apply to anything that you read in order to help you understand it. Such strategies exist, although they pretty much boil down to one single strategy – asking yourself questions whilst reading. These strategies can also be explicitly taught to students and confer an advantage. However, they tend to provide a one-off boost which further repetition and practice doesn't seem to increase very much.

The same can be said of critical thinking skills or 'learning to learn' skills. Asking yourself questions whilst reading a text is only helpful if you can answer those questions. Similarly with critical thinking; asking who wrote a source is only of any use if you can find the answer and know what this means. The fact that a source was written by a loyalist doesn't help much if you don't know anything about the American Revolution.

Similarly, learning to learn – when not presented vaguely – seems to reduce to study skills and, of these, the evidence for self-testing stands-out from the rest. It's worth knowing that this is a good

studying strategy but it acts to help consolidate the knowledge base rather than reduce the need for it. And it's all rather prosaic when you consider the fact that these ideas are often sold as somehow teaching students how to think.

## 4. Knowledge-based education is really boring

We tend to conjure an image of some kind of nineteenth century classroom where the teacher beats facts into children at the end of a cane. And yet what is being proposed instead?

I cannot think of anything worse than spending hour after lengthy hour repeating reading comprehension exercises. In his recent book, David Perkins makes the case for authentic learning activities in which students – naturally acting like experts – engage in, "Project-based learning in mathematics or science, which, for instance, might ask students to model traffic flow in their neighbourhood or predict water needs in their community over the next twenty years."

Really?

Set against this, a whole-class discussion of the dinosaurs or the possibility of alien life or the battle of El Alamein or the concept of infinity or whether Macbeth is a misogynistic play; these all seem positively in-tune with your average teenager's interests.

The purpose of education is not to entertain; it is to educate. But if the criticism of knowledge-based education is that it is boring then the critics need to work a bit harder on the alternative.

## 5. Education must be personalised

Setting aside practical considerations, education should clearly work better if it meets students at their point of need. However, it needs to meet them there and then take them somewhere else. To borrow from Eric Kalenze, education should act like a funnel that prepares diverse students for college, careers and engagement in civic society.

However, it seems as if we have lost this clear mission. If students are pursuing their own interests and are expected to engage in learning only if we make it as easy and as accessible as possible then how are we preparing them for life after school?

Imagine a tour operator running trips to Greece. Of course, the tour operator needs to take account of where people are travelling from so that she can arrange planes and the like. But she still has to *get them to Greece*. It would be a poor tour operator indeed that told people not to bother going there and to go for a walk around their home town instead.

Students need to be able to read, write and do basic maths. These are functional skills that society demands and, in order to do the first of these, they will need a fair amount of general knowledge. As an advocate of the liberal arts, I would also argue that education must go beyond a merely instrumental role and seek to improve the quality of people's lives. By taking academic studies further we open up opportunities for future study, careers or cultural interests.

This is the mission.

# 5 conceptions erronées courantes sur l'apprentissage (traduction-synthèse par Françoise Appy)

- Source : 5 conceptions erronées courantes sur l'apprentissage Traduction-synthèse par Françoise Appy, Form@PEx, 28 mai 2019

Elles ont l’air correctes, mais le sont-elles ?

## 1. Les novices doivent imiter les experts

Les experts possèdent une grande quantité de connaissances, ce qui leur permet d’agir différemment. Il est facile de sous-estimer l’importance de cela. Une découverte majeure des sciences cognitives est que les experts et les novices ont besoin de différents types d’enseignement.

Les novices ont besoin que les idées complexes soient divisées en petites étapes et que ces étapes leur soient enseignées explicitement. Les experts apprennent mieux en résolvant des problèmes de plus en plus ouverts et en menant des investigations.

## 2. Vous comprenez mieux les concepts si vous les découvrez par vous-même

Dans une étude clé, les étudiants étaient divisés en deux groupes de manière aléatoire. Le premier groupe recevait un enseignement explicite des principes scientifiques du contrôle des variables. Au second groupe, on donnait des enquêtes à compléter dans lesquelles ils devaient conclure tout seuls. Moins d’étudiants du deuxième groupe ont appris le principe. Cependant, ceux qui, dans ce même groupe, l’avaient appris, ne furent pas meilleurs que les étudiants du premier groupe pour évaluer des faits scientifiques. La pratique par découverte ne présentait aucun avantage.

## 3. La métacognition est un raccourci pour l’expertise

Il serait très intéressant de trouver un moyen pour développer l’expertise sans que les étudiants aient à apprendre et à pratiquer d’ennuyeux exercices. Peut-être devrions-nous enseigner les stratégies générales utilisables pour un panel de situations. Ainsi, nous pourrions enseigner Comment apprendre, et ils pourraient appliquer cela à tous leurs futurs sujets d’étude. Les preuves montrent que certaines stratégies peuvent être enseignées explicitement et être profitables aux étudiants. Cependant, elles montrent aussi quelque chose d’exceptionnel : un entraînement continu ne semble pas amener beaucoup d’amélioration.

## 4. Un enseignement basé sur les connaissances est ennuyeux

Les pédagogues proposent souvent des alternatives à l'enseignement des faits. Dans un ouvrage récent, David Perkins défend l'idée qu'il faut enseigner des tâches dans lesquelles les étudiants s'engagent, comme « l'apprentissage basé sur les projets en mathématiques ou en science, qui, par exemple, demandent aux étudiants de modifier le flot du trafic dans leur voisinage ou de prédire les besoins en eau de leur communauté pour les 20 années à venir. » En opposition à cela, une discussion en classe entière sur l'extinction des dinosaures ou sur la bataille d'El Alamein, ou sur la question de savoir si Macbeth est une pièce misogyne, sont des sujets apparemment en accord avec les intérêts des adolescents.

## L'enseignement doit être personnalisé

Imaginez un organisateur de voyage touristique en Grèce. Bien sûr, il doit tenir compte du lieu de départ afin d'organiser le vol aérien. Mais il faut aussi amener les visiteurs en Grèce. Il serait bien incompétent s'il disait à ses clients potentiels de ne pas se rendre en Grèce et de rester tranquillement chez eux à la place. Les étudiants ont besoin de savoir lire, écrire et les bases mathématiques. Ce sont les habiletés fonctionnelles et la société exige qu'elles soient enseignées effectivement à tous par un enseignement interactif. La compréhension en lecture nécessite une grande quantité de connaissances générales et non quelques connaissances liées aux intérêts personnels à un étudiant en particulier.