

DIFFERENT WAYS OF LEARNING

Digital and Traditional Learning

Digital Skills 4 All

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The module makes a careful analysis of the different ways of learning, namely traditional learning and learning in the technological age. In particular, the importance of "lectures" is emphasized, as well as the design and organization of the classrooms, and an important study on the formal learning methods of Francis Fukuyama.

Reference is made to research on classical and online teaching, in which it is shown that in some contexts it does not work, for example many children would have used the PC in the classroom just for fun and not for study.

Another aspect considered is the e-learning factor, with strengths and weaknesses, and above all how learning in the digital age can be used to be effective.

TEACH IN A DIGITAL AGE

How the classroom design model was born

Our institutions are a reflection of the times in which they were created. Francis Fukuyama, in his monumental writing on political development and political decay (2011, 2014), points out that institutions that provide essential functions within a state often become so fixed overtime in the original structures that they fail to adapt and adjust to changes in the external environment.

We need therefore to examine in particular the roots of our modern educational systems, because teaching and learning in the present day is still strongly influenced by institutional structures developed many years ago. Thus, we need to examine the extent to which our traditional campus-based models of teaching remain fit for a digital age. The large urban school, college or university, organized by age stratification, learners meeting in groups, and regulated units of time, was an excellent fit for an industrial society. In effect, we still have a predominantly factory model of educational design, which in large part remains our default design model even today. Some design models are so embedded in tradition and convention that we are often like fish in water – we just accept that this is the environment in which we have to live and breathe. The classroom model is a very good example of this. In a classroom based model, learners are organized in classes that meet on a regular basis at the same place at certain times of the day for a given length of time over a given period.

This is a design decision that was taken more than 150 years ago. It was embedded in the social, economic and political context of the 19th century. This context included:

- the industrialization of society which provided ‘models’ for organizing both work and labor, such as factories and mass production;
- the movement of people from rural to urban occupations and communities, with increased density resulting in larger institutions;
- the move to mass education to meet the needs of industrial employers and an increasingly large and complex range of state-managed activities, such as government, health and education;
- voter enfranchisement and hence the need for a better educated voting public;
- overtime, demand for more equality, resulting in universal access to education.

However, over the span of 150 years, our society has slowly changed. Many of these factors or conditions no longer exist, while others persist, but often in a less dominant way than in the past. Thus we still have factories and large industries, but we also have many more small companies, greater social and geographical mobility, and above all a massive development of new technologies that allow both work and education to be organized in different ways. This is not to say that the classroom design model is inflexible. Teachers for many years have used a wide variety of teaching approaches within this over all institutional framework. But in particular, the way in which our institutions are structured strongly affects the way we teach. We need to examine which of the methods built around a classroom model are still appropriate in today’s society, and, more of a challenge, whether we could build new or modified institutional structures that would better meet the needs of today.

Transmissive lectures can be traced back as far as ancient Greek and Roman times, and certainly from at least the start of the European university, in the 13th century. The term ‘lecture’ comes from the Latin, meaning a reading. In the 13th century, most books were extremely rare. They were handcrafted and illustrated by monks, often from fragments or collections of earlier and exceedingly rare and valuable

scrolls from ancient Greek or Roman times, or were translated from Arabic sources, since much documentation was destroyed in Europe during the Dark Ages following the fall of the Roman empire. As a result, a university would often have only one copy of a book, and it may have been the only copy available in the world. The library and its collection therefore became critical to the reputation of a university, and professors had to borrow the only text from the library and literally read from it to the students, who dutifully wrote down their own version of the lecture. Lectures themselves belong to an even longer oral tradition of learning, where knowledge is passed on by word of mouth from one generation to the next. In such contexts, accuracy and authority (or power in controlling access to knowledge) are critical for 'accepted' knowledge to be successfully transmitted. Thus accurate memory, repetition and a reference to authoritative sources become exceedingly important in terms of validating the information transmitted. The great sagas of the ancient Greek and, much later, of the Vikings, are examples of the power of oral transmission of knowledge, continued even today through the myths and legends of many indigenous communities.

The effectiveness of the lessons

An important study of lectures was led by Samuel Johnson, foresees a great deal of research into the effectiveness of lectures, going back to the 1960s, and continued through until today. The most authoritative analysis of the research on the effectiveness of lectures remains Bligh's. He summarized a wide range of meta-analyses and studies of the effectiveness of lectures compared with other teaching methods and found consistent results:

- the lecture is as effective as other methods for transmitting information (the corollary of course is that other methods – such as video, reading, independent study, or Wikipedia –are just as effective as lecturing for transmitting information);
- most lectures are not as effective as discussion for promoting thought;
- lectures are generally ineffective for changing attitudes or values or for inspiring interest in a subject;
- lectures are relatively ineffective for teaching behavioral skills.

'We see evidence... once again to suppose that lectures should not be longer than twenty to thirty minutes – at least without techniques to vary stimulation.'

These research studies have shown that in order to understand, analyze, apply, and commit information to long-term memory, the learner must actively engage with the material. In order for a lecture to be effective, it must include activities that compel the student to mentally manipulate the information. Many lecturers of course do this, by stopping and asking for comments or questions throughout the lecture – but many do not. Again, although these findings have been available for a long time, and You Tube videos now last approximately eight minutes and people talk 20 minutes at a maximum, teaching in many educational institutions is still organized around a standard 50 minute lecture session or longer, with, if students are lucky, a few minutes at the end for questions or discussion. There are two important conclusions from the research:

- even for the sole purpose for which lectures may be effective – the transmission of information – the 50 minute lecture needs to be well organized, with frequent opportunities for student questions and discussion;

- for all other important learning activities, such as developing critical thinking, deep understanding, and application of knowledge – the kind of skills needed in a digital age – lectures are ineffective. Other forms of teaching and learning – such as opportunities for discussion and student activities – are necessary.

To make the lessons more relevant, it is better to use new technologies

Over the years, institutions have made massive investments in adding technologies to support lecturing. Power point presentations, multiple projectors and screens, clickers for recording student responses, even ‘back-chat’ channels on Twitter, enabling students to comment on a lecture – or more often, the lecturer – in real time, have all been tried. Students have been asked to bring tablet, and universities in particular have invested millions of dollars in state of the art lecture theatres. Nevertheless, all this is just lipstick on a pig. The essence of a lecture remains the transmission of information, all of which is now readily and, in most cases, freely available in other media and in more learner-friendly formats. At least in these classes, there were some activities to do related to the lecture that required the students to use the laptops during class time. However in most classes this took less than 25 percent of the less on time. Most of the other time, students were talked at, and as a result used their laptops for other, mainly non-academic activities, especially playing online poker. Faculty often complain about students use of technology such as mobile phones or tablets, for ‘non-relevant’ multitasking in class, but this misses the point. If most students have mobile phones or laptops, why are they still having physically to come to a lecture hall? Why can’t they get a podcast or a video of the lecture? Second, if they are coming, why are the lecturers not requiring them to use their mobile phones, tablets, or laptops for study purposes, such as finding sources? Why not break the students into small groups and get them to do some online research then come back with group answers to share with the rest of the class? If lectures are to be offered, the aim should be to make the lecture engaging in its own right, so the students are not distracted by their online activity.



So lectures will have no role in the digital age?

Lectures though still have their uses. One example is an inaugural lecture for a newly appointed research professor. In this lecture, the professor summarized all the research he and his team had done, resulting in treatments for several cancers and other diseases. This was a public lecture, so he had to satisfy not only other leading researchers in the area, but also a lay public with often no science background. He did this by using excellent visuals and analogies. The lecture was followed by a small wine and cheese reception for the audience. The lecture worked for several reasons:

- first of all, it was a celebratory occasion bring together family, colleagues and friends;
- second, it was an opportunity to pull together nearly 20 years of research into a single, coherent narrative or story;
- third, the lecture was well supported by an appropriate use of graphics and video;
- lastly, he put a great deal of work into preparing this lecture and thinking about who would be in the audience – much more preparation than would have been the case if this was just one of many lectures in a course.

McKeachie and Svinicki believe that lecturing is best used for:

- providing up-to-date material that can't be found in one source;
- summarizing material found in a variety of sources;
- adapting material to the interests of a particular group;
- initially helping students discover key concepts, principles or ideas;
- modeling expert thinking.

The last point is important. Faculty often argue that the real value of a lecture is to provide a model for students of how the faculty member, as an expert, approaches a topic or problem. Thus the important point of the lecture is not the transmission of content, which the students could get from just reading, but an expert way of thinking about the topic. The trouble with this argument for lectures is three-fold:

- students are rarely aware that this is the purpose of the lecture, and therefore focus on memorizing the content, rather than the 'modeling' of expert thinking;
- faculty themselves are not explicit about how they are doing the modeling (or fail to offer other ways in which modeling could be used, so students can compare and contrast);
- students get no practice themselves in modeling this skill, even if they are aware of the modeling.

Perhaps more importantly, looking at McKeachie and Svinicki's suggestions, would it not be better for the students, rather than the lecturer, to be doing these activities in a digital age? So, yes, there are a few occasions when lectures work very well. But in a digital age they should not be the default model for regular teaching. There are much better ways to teach that will result in better learning over the length of a course or program.

Why lectures are still the main form of education?

Given all of the above, some explanation needs to be offered for the persistence of the lecture into the 21st century. Here are some suggestions:

- in fact, in many areas of education, the lecture has been replaced, particularly in many elementary or primary schools;
- architectural inertia: a huge investment has been made by institutions in facilities that support the lecture model. What is to happen to all that real estate if it is not used? (As Winston Churchill said, *'We shape our buildings and our buildings shape us'*);
- in North America, the Carnegie unit of teaching, which is based on a notion of one hour per week of classroom time per credit over a 13 week period. It is easy then to divide a three credit course into 39 one hour lectures over which the curriculum for the course must be covered. It is on this basis that teaching load and resources are decided;
- faculty in post-secondary education have no other model for teaching. This is the model they are used to, and because appointment is based on training in research or work experience, and not on qualifications in teaching, they have no knowledge of how students learn or confidence or experience in other methods of teaching;
- lot of experts prefer the oral tradition of teaching and learning, because it enhances their status as an expert and source of knowledge; being allowed an hour of other people's time to hear your ideas without major interruption is very satisfying on a personal level.

Will the lectures have a future in the digital age?

That depends on how far into the future one wants to look. Given the inertia in the system, lectures are likely still to predominate for another ten years, but after that, in most institutions, courses based on three lectures a week over 13 weeks will have disappeared. There are several reasons for this:

- all content can be easily digitalized and made available on demand at very low cost;
- institutions will be making greater use of dynamic video for demonstration, simulations, animations, etc. Thus most content modules will be multi-media;
- open textbooks incorporating multimedia components and student activities will provide the content, organization and interpretation that are the rationale for most lectures;
- lastly, and most significantly, the priority for teaching will have changed from information transmission and organization to knowledge management, where students have the responsibility for finding, analyzing, evaluating, sharing and applying knowledge, under the direction of a skilled subject expert.

Project-based learning, collaborative learning and situated or practical learning will become much more widely prevalent. Also many instructors will prefer to use the time they would have spent on a series of lectures in providing more direct, individual and group learner support, thus bringing them into closer contact with learners. This does not mean that lectures will disappear altogether, but they will be special events, and probably multi-media, synchronously and asynchronously delivered. Special events might include:

- a professor's summary of her latest research,
- the introduction to a course,
- a point mid-way through a course for taking stock and dealing with common difficulties, or
- the wrap-up to a course.

Lectures will provide a chance for instructors to make themselves known, to impart their interests and enthusiasm, and to motivate learners, but this will be just one, relatively small, but important component of a much broader learning experience for students.



DIGITAL SKILLS AND COMPETENCE

Research and practice suggest different definitions and classifications of digital skills and competence (DSC). An emerging classification in the EU identifies three main categories of DSC for learners/citizens.

- **Digital competence:** also referred to as digital literacy, encompasses a set of basic digital skills, covering information and data literacy, online communication and collaboration, digital content creation, safety and problem solving. Digital competence is about the ability to apply those digital skills in a confident, critical and responsible way in a defined context.
- **Job-specific digital skills:** a set of specific digital skills for those involved in jobs including the use and maintenance of digital tools such as 3D printers, CAD software and robots.
- **Digital skills for ICT professionals:** a set of advanced, highly specialized, digital skills for those involved in the ICT occupations, programmers and cyber security experts who are expected not only to use but also challenge and innovate existing information and communication technologies and create new solutions.

DIGITAL AND ONLINE LEARNING

Among policy makers and practitioners, there is a broad recognition that the use of ICT in education can improve both the internal efficiency, and the external economic and social efficiency of education and training. The ubiquity of digital devices and the Internet offers new opportunities to apply personalized teaching and learning strategies based on a student-centered approach.

At the same time, research and practice show a widespread and fundamental lack of clarity about the use of ICT in education – in terms of its concept, definition, purpose, implementation and prerequisites. There is uncertainty over the extent to which students' engagement with technology may harm their involvement with school or feelings of belonging.

Research and literature often use the term e-learning when referring to the use of ICT in education.

In 2014, within the ET 2020 framework, the European Commission introduced the broader term 'digital and online learning' (DOL) to emphasize the two main components of today's e-learning':

- **Digital learning:** a form of teaching and learning supported by ICT. It encompasses multiple formats and hybrid methods, including the use of software installed locally;
- **Online learning:** today's prevalent form of distance learning, imparted mainly via the Internet, incorporating social media and web 2.0 services for a collaborative and personalized learning experience, anywhere and at any time via desktop and mobile computing devices. It can also involve the use of Open educational resources. In this paper 'digital and online learning' (DOL), 'e-learning' and 'digital learning' are considered synonyms.

Researchers and pathfinders in education are constantly exploring new forms of teaching, learning and assessment that can help improve learners' proficiency. DOL seems to be a step change in innovating and individualizing pedagogy for learners, including those with disabilities, and in providing solutions for an education journey that starts at birth and is expected to last a lifetime.

By using DOL, teachers and learners can also develop their DSC and their soft skills through participatory learning methodologies based on connectivist and constructivist learning. When effectively integrated, DOL can provide students, teachers and trainers with engaging opportunities to find and utilize multimedia information, and to apply academic and vocational skills to solving real work problems/situations that could be connected, simulated, or expressed as virtual reality in schools.

Teachers' awareness of and interest in the potential of a pedagogical use of ICT (DOL) is on the rise. The European Schoolnet's survey of the use of ICT in European Schools reported that Europe's teachers have high aspirations to improve their own understanding of ICT, and that the majority of European teachers engage in personal learning related to ICT. Further, the survey shows that the teachers who are more confident about ICT make greater use of it in teaching and learning, even in those schools that are poorly equipped.

DOL also introduces new challenges and risks. For example, a challenge for DOL as a form of distance learning relates to identity, namely who is actually performing. Fingerprint technologies and face or retina recognition software are increasingly used in education, but this is still at an early stage and with a limited regulation. A change in the direction of establishing a digitally innovative pedagogy that is both sustainable and scalable requires strong 'analogical' components. Firstly, it requires 'digitally competent and ready' educational organizations that are able to provide, for example, an adequate ICT infrastructure and a

leadership that allows the use of, and experimentation with, DOL. Secondly, it needs digitally competent teachers and trainers who are confident users of digital tools, such as smart boards, and know how to implement group work, personalize learning and blend traditional and innovative pedagogy through DOL. Last but not least, digitally innovative pedagogy requires that education policy and institutions create an enabling context in which DOL is for everyone, and where it can flourish by ensuring system-wide good governance and oversight of quality, while promoting the necessary education reforms and investments. It is worth recalling that DOL is an opportunity to develop, and not a precondition for, innovative pedagogy.

THE IMPORTANCE OF OPEN EDUCATIONAL RESOURCES

The classroom upside down

In 1993 Alison King in her article 'From Sage on the Stage to Guide on the Side' had already highlighted the importance of using class time for the construction of meaning rather than information transmission (King, 1993). In 1997, Harvard professor Eric Mazur further developed King's work, introducing the concept of peer relearning (Mazur, 1997). Finally, in 2000 Lage, Platt and Treglia introduced the concept of the flipped classroom in their paper 'Inverting the Classroom: A Gateway to Creating an Inclusive Learning Environment', while explaining the results of their research at college level.

Today, although a common international methodology for the flipped classroom does not yet exist, there is increasing interest in the use of this concept in education and training, as testified by research, practice and publications. World-wide, many teachers and trainers are experimenting with the core idea of flipping the traditional instructional approach, with instruction that used to occur in classroom being accessed at home, in advance of the class, through self-directed and collaborative web-based learning. For example, students at home could watch teacher-created videos, use various media for advancing concepts and engage in collaborative peer learning.

Wide availability, cost reductions and the simplification of video making and distribution are making the flipped classroom and, in general, digital pedagogy increasingly accessible and of interest in developing and transition countries.

The importance of Social media

Learning is increasingly occurring outside schools and social media can offer a range of learning opportunities through people accessing expert advice, encountering challenges, and defending their own opinions or amending them in the face of different ideas.

A research on the use of social media in VET courses in Australia highlights, for example, that students seem more willing to ask questions online than face-to-face although they seem to have little understanding of the privacy setting and other risks related to the use of social media, such as inaccurate information, fake news and biased comments.

In many partner countries teachers, trainers or even groups of students have created ad-hoc groups in Facebook to share experiences and make connections, linking these with teaching resources. For example in Montenegro, a piece of research on DOL in VET revealed that most vocational schools have created Facebook profiles, as this is the most convenient means of communicating with students. As is typical in

innovative digital pedagogies, educators on social media have multiple roles that differ from those found in the classroom.

YouTube, a video-sharing platform, can be used to share webinars, recorded lectures and presentations by industry experts. It can also be used by students to demonstrate, for example, the completion of an assignment.

Twitter can be a valuable world-wide source of information and intelligence. Students can use Twitter to improve their practice in the promotion of services or products related to their study or follow high-level experts.

Less used than Facebook and YouTube, Blogs can be used when, for example, students need to reflect on and share personal views of lessons or experiences in the workplace. A limit to its use is the need for higher levels of writing skills.

In conclusion, even though the honeymoon between social media and education is over, social media continue to offer a number of benefits for teaching and learning.

Electronic Portfolios

The Electronic Portfolio represents an extension of the portfolio concept for the digital age, and is a new pattern for timely, authentic, specific forms of formative assessment. The concept of a portfolio of work is familiar from the art and design sector, where, traditionally a visual artist has been able to demonstrate their skills, talents and creative flair through presenting a portfolio of work to a potential client or employer.

Nowadays, a vocational student, for example, can gather a collection of artifacts that is representative of his/her achievements, which could be in the form of photographs, videos, audio recordings or testimonials, together with the regular forms of assessment evidence such as transcripts. Since the Electronic Portfolio is a 'live' resource it is constantly evolving and tutors are able to add comments on its content and development, enabling the Electronic Portfolio to be both a formative and summative assessment tool.

The Electronic Portfolio includes several features of DOL, providing a space where learners can be guided towards new knowledge and skills through investigations and web-quests, moderated and facilitated by online teachers and trainers whose assessments and feedback become part of the learning process, and where the learners themselves can interact and provide peer-to peer feedback.

Although, there is minimal documented evidence of the use of Electronic Portfolios in VET, their practice can support a shift from standard common summative tests to individual formative assessment. Several of the best performing education systems have based their education policy reform on this principle. For example, the Finnish education system, which is considered, according to several international scientific performance indicators such as PISA, a strong 'performer', has reduced the use of formal and summative student testing to a necessary minimum.

Can I bring my device?

As mobile technology becomes more affordable and available in many countries, educational organizations are increasingly considering the establishment of 'bring your own device' (BYOD) schemes, which encourage students to bring their own laptop or tablet device to school to be used as a digital learning tool.

However, BYOD policies and practices need to be accompanied by guidelines for the use of personal devices on school grounds that all learners must agree to and comply with. Some schools call these General Guidelines, while others refer to an Acceptable Use Policy.

Many EU countries are also piloting a BYOD policy. For example, in Germany a pilot of the project "Start into the next generation" has recently taken place. The pilot has been run in six schools for the past two years. Given the preliminary good outcomes, the pilot has been extended and scaled up to 50 schools. An evaluation of the project by the University of Hamburg is nearing completion.

In many developing countries, including the ETF's partner countries, in spite of chronic problems related to hardware rapidly becoming out of date and needing expensive maintenance, so far it is rare to find any positive reference to the BYOD policy. All too often the fear of student distraction/loss of class control and the lack of confidence is such that many teachers and trainers expressly forbid the use of students' own devices – mobile phones, tablets, and laptops – in the classrooms or workshops.



LEARNING BY DOING

Learning in the online environment

The apprenticeship model of teaching can work in both face-to-face and online contexts, but if there is an online component, it usually works best in a hybrid format. One reason why some institutions are moving more material online in apprenticeship programs is because the cognitive learning element in many trades and professions has rapidly increased, as trades have required more academic learning, such as increased ability in mathematics, electrical engineering and electronics. This ‘academic’ component of apprenticeship can usually be handled just as well online, and enables apprentices to study this component when they are not working, thus saving employers’ time as well.

Strengths and weaknesses

The main advantages of an apprenticeship model of teaching can be summarized as follows:

- teaching and learning are deeply embedded within complex and highly variable contexts, allowing rapid adaptation to real-world conditions;
- it makes efficient use of the time of experts, who can integrate teaching within their regular work routine;
- it provides learners with clear models or goals to aspire to;
- it acculturates learners to the values and norms of the trade or profession.

On the other hand, there are some serious limitations with an apprenticeship approach, particularly in preparing for university teaching:

- much of a master’s knowledge is tacit, partly because their expertise is built slowly through a very wide range of activities;
- experts often have difficulty in expressing consciously or verbally the schema and ‘deep’ knowledge that they have built up and taken almost for granted, leaving the learner often to have to guess or approximate what is required of them to become experts themselves;
- experts often rely solely on modeling with the hope that learners will pick up the knowledge and skills from just watching the expert in action, and don’t follow through on the other stages that make an apprenticeship model more likely to succeed;
- there is clearly a limited number of learners that one expert can manage, given that the experts themselves are fully engaged in applying their expertise in often demanding work conditions which may leave little time for paying attention to the needs of novice learners in the trade or profession;
- traditional vocational apprenticeship programs have a very high attrition rate: for instance, in British Columbia, more than 60 per cent of those that enter a formal campus-based vocational apprenticeship program withdraw before successful completion of the program. As a result, there are large numbers of experienced tradespeople in the workforce without full accreditation, limiting their career development and slowing down economic development where there are shortages of fully qualified skilled workers;
- in trades or occupations undergoing rapid change in the workplace, the apprenticeship model can slow adaptation or change in working methods, because of the prevalence of traditional values and norms being passed down by the ‘master’ that may no longer be as relevant in the new conditions facing workers. This limitation of the apprenticeship model can be clearly seen in the post-secondary

education sector, where traditional values and norms around teaching are increasingly in conflict with external forces such as new technology and the massification of higher education.

Experiential learning: learning by doing

There are a number of different approaches or terms within this broad heading, such as experiential learning, cooperative learning, adventure learning and apprenticeship. Will use the term 'experiential learning' as a broad umbrella term to cover this wide variety of approaches to learning by doing.

What is experiential learning?

Simon Fraser University defines practical learning as:

“The strategic, active engagement of students in opportunities to learn through doing, and reflection on those activities, which empowers them to apply their theoretical knowledge to practical endeavors in a multitude of settings inside and outside of the classroom.”

There is a wide range of design models that aim to embed learning within real world contexts, including:

- laboratory, workshop or studio work;
- apprenticeship;
- problem-based learning;
- case-based learning;
- project-based learning;
- inquiry-based learning;
- cooperative (work- or community-based) learning.

The focus here is on some of the main ways in which practical learning can be designed and delivered, with particular respect to the use of technology, and in ways that help develop the knowledge and skills needed in a digital age.

Design principles

Practical learning focuses on learners reflecting on their experience of doing something, so as to gain conceptual insight as well as practical expertise. For example, Kolb's practical learning model suggests four stages in this process:

- active experimentation;
- concrete experience;
- reflective observation;
- abstract conceptualization.

Learn from problems

The earliest form of systematized problem-based learning (PBL) was developed in 1969 by Howard Barrows and colleagues in the School of Medicine at McMaster University in Canada, from where it has spread to many other universities, colleges and schools. This approach is increasingly used in subject domains where the knowledge base is rapidly expanding and where it is impossible for students to master all the knowledge in the domain within a limited period of study. Working in groups, students identify what they already know, what they need to know, and how and where to access new information that may lead to resolution of the problem. The role of the instructor (usually called a tutor) is critical in facilitating and guiding the learning process. Usually PBL follows a strongly systematized approach to solving problems, although the detailed steps and sequence to vary to some extent, depending on the subject domain. The following is a typical example:

Traditionally, the first five steps would be done in a small face-to-face class tutorial of 20-25 students, with the sixth step require in their individual or small group (four or five students) private study, with a the seventh step being accomplished in a full group meeting with the tutor. However, this approach also lends itself to blended learning in particular, where the research solution is done mainly online, although some instructors have managed the whole process online, using a combination of synchronous web conferencing and asynchronous online discussion. Developing a complete problem-based learning curriculum is challenging, as problems must be carefully chosen, increasing in complexity and difficulty over the course of study, and problems must be chosen so as to cover all the required components of the curriculum. Students often find the problem-based learning approach challenging, particularly in the early stages, where their foundational knowledge base may not be sufficient to solve some of the problems. Others argue that lectures provide a quicker and more condensed way to cover the same topics. Assessment also has to be carefully designed, especially if a final exam carries heavy weight in grading, to ensure that problem-solving skills as well as content coverage are measured. However, research has found that problem-based learning is better for long-term retention of material and developing 'replicable' skills, as well as for improving students 'attitudes towards learning. There are now many variations on the 'pure' PBL approach, with problems being set after initial content has been covered in more traditional ways, such as lectures or prior reading, for instance.



Learn from the case

With case-based teaching, students develop skills in analytical thinking and reflective judgment by reading and discussing complex, real-life scenarios. University of Michigan Centre for Research on Teaching and Learning Case-based learning is sometimes considered a variation of PBL, while others see it as a design model in its own right. As with PBL, case-based learning uses a guided inquiry method, but usually requires the students to have a degree of prior knowledge that can assist in analyzing the case. There is usually more flexibility in the approach to case-based learning compared to PBL. Case-based learning is particularly popular in business education, law schools and clinical practice in medicine, but can be used in many other subject domains.

Starting from the project

Project-based learning is similar to case-based learning, but tends to be longer and broader in scope, and with even more student autonomy/responsibility in the sense of choosing sub-topics, organizing their work, and deciding on what methods to use to conduct the project. Projects are usually based around real world problems, which give students a sense of responsibility and ownership in their learning activities. Once again, there are several best practices or guidelines for successful project work. For instance, Larmer and Mergendoller (2010) argue that every good project should meet two criteria:

- students must perceive the work as personally meaningful, as a task that matters and that they want to do well;
- a meaningful project fulfills an educational purpose.

The main danger with project-based learning is that the project can take on a life of its own, with not only students but the instructor losing focus on the key, essential learning objectives, or important content areas may not get covered. Thus project-based learning needs careful design and monitoring by the instructor.

Learning by investigating

Inquiry-based learning (IBL) is similar to project-based learning, but the role of the teacher/instructor is somewhat different. In project-based learning, the instructor decides the 'driving question' and plays a more active role in guiding the students through the process. In inquiry-based learning, the learner explores a theme and chooses a topic for research develops a plan of research and comes to conclusions, although an instructor is usually available to provide help and guidance when needed.

Practical learning in online learning environments

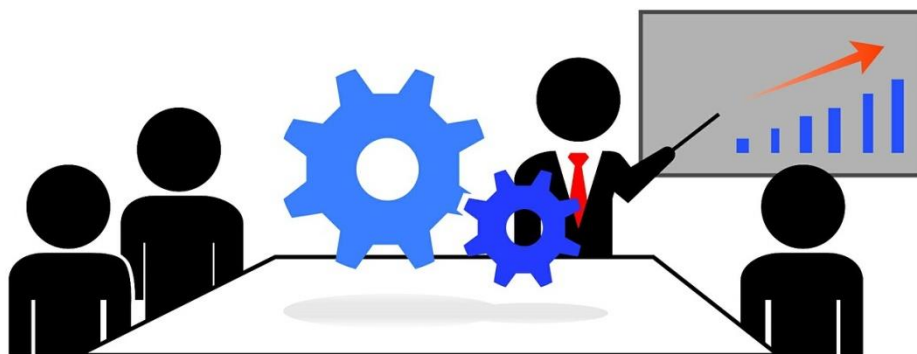
Advocates of practical learning are often highly critical of online learning, because, they argue, it is impossible to embed learning in real world examples. However, this is an over simplification, and there are contexts in which online learning can be used very effectively to support or develop experiential learning, in all its variations:

- blended or flipped learning: although group sessions to start off the process, and to bring a problem or project to a conclusion, are usually done in a classroom or lab setting, students can increasingly conduct the research and information gathering by accessing resources online, by using online multimedia resources to create reports or presentations, and by collaborating online through group project work or through critique and evaluation of each other's work;
- fully online: increasingly, instructors are finding that practical learning can be applied fully online, through a combination of synchronous tools such as web conferencing, asynchronous tools such as discussion forums and/or social media for group work, e-portfolios and multimedia for reporting, and remote labs for experimental work.

Indeed, there are circumstances where it is impractical, too dangerous, or too expensive to use real world experiential learning. Online learning can be used to simulate real conditions and to reduce the time to master a skill. Flight simulators have long been used to train commercial pilots, enabling trainee pilots to spend less time mastering fundamentals on real aircraft. Commercial flight simulators are still extremely expensive to build and operate, but in recent years the costs of creating realistic simulations has dropped dramatically.

Strengths and weaknesses of practical learning

How one evaluates practical learning designs depends partly on one's epistemological position. Constructivists strongly support practical learning models, whereas those with a strong objectivist position are usually highly skeptical of the effectiveness of this approach. Nevertheless, problem-based learning in particular has proved to be very popular in many institutions teaching science or medicine, and project-based learning is used across many subject domains and levels of education. There is evidence that experiential learning, when properly designed, is highly engaging for students and leads to better long-term memory. Proponents also claim that it leads to deeper understanding, and develops skills for a digital age such as problem-solving, critical thinking, improved communications skills, and knowledge management. In particular, it enables learners to manage better highly complex situations that cross disciplinary boundaries, and subject domains where the boundaries of knowledge are difficult to manage. In so far as there is any evidence from controlled studies, it almost uniformly supports direct, strong instructional guidance rather than constructivist-based minimal guidance during the instruction of novice to intermediate learners. Even with students with considerable prior knowledge, strong guidance when learning is most often found to be equally effective as unguided approaches.



Certainly, practical learning approaches require considerable restructuring of teaching and a great deal of detailed planning if the curriculum is to be fully covered. It usually means extensive retrain care full orientation and preparation of students. Kirschneretal just giving students tasks to do in real world situations without guidance and support is likely to be ineffective. However, many forms of practical learning can and do have strong guidance from instructors, and one has to be very careful when comparing matched groups that the tests of knowledge include measurement of the skills that are claimed to be developed by experiential learning, and are not just based on the same assessments as for traditional methods, which often have a heavy bias towards memorization and comprehension. We should to support the use of practical learning for developing the knowledge and skills needed in a digital age, but as always, it needs to be done well, following best practices associated with the design models.

The roles of learners and teachers

Of all the perspectives on teaching these two are the most learner-centered. They are based on an optimistic view of human nature, that people will seek out and learn what they need, and will find the necessary support from caring, dedicated educators and from others with similar interests and concerns, and those individuals have the capacity and ability to identify and follow through with their own educational needs. It is also a more radical view of education, because it seeks to escape the political and controlling aspects of state or private education. Within each of these two perspectives, there are differences of view about the centrality of teachers for successful learning. For Pratt, for example, the teacher plays a central role in nurturing learning; for others, professionally trained teachers are more likely to be the servant of the state than of the individual learner.

NON-FORMAL LEARNING

The history before discussing the concept of non-formal learning, a clarification of the terms 'education' and 'learning' is needed here first. Coombs and Ahmed (1974) were the first to use the term 'non-formal education'. They had a conviction that education can no longer be confined to time-bound and place-bound school settings or quantified by years of exposure, and concluded that education could be equated with learning, "regardless of where, how or when the learning occurs". As a result, they used the term 'education' instead of 'learning' in their discussions, in which they also referred to learning, but as something with a slightly different meaning from education. Similar situations have been found where scholars have blurred the boundary between 'education' and Australian society for music education incorporated as me Non-formal learning: clarification of the concept and its application in music learning.

Non-formal learning

The concept, 'non-formal' learning is not a new concept. As already mentioned, the concept of no formal education was introduced in the 1970s by Coombs and Ahmed, and it appeared in a book entitled attacking rural poverty: How no formal education can help (1974). Coombs and Ahmed defined non-formal education as: any organized, systematic, educational activity carried on outside the framework of the formal system to provide selected types of learning to particular subgroups in the population, adults as well as children. Therefore, the learning includes both learners (recipients) and a/some transmitter(s) and their activities

were held outside the formal system, which can be understood as ‘school’. However, it is not clear what is meant by ‘selected types of learning’, or exactly who can be included in the ‘particular subgroups in the population’. In addition to the context of this type of learning, which is outside the formal system, the autonomous nature of non-formal learning has also been referred to. Reddy says that non-formal learning consists of “activities outside the formal learning setting, characterized by voluntary as opposed to mandatory participation”. Two points are made here:

- Non-formal learning takes place outside of a formal learning setting, and it is engaged in voluntarily. Reddy thus goes one step further in mentioning the issue of autonomy in learning. In the field of music education, Morgan (2000) defines the concept of non-formal learning. In his study of the Band and Music Service world in Northern Ireland, with regard to the context of this type of learning, he described non-formal learning as: a form of learning that takes place outside the parameters of the traditional learning structures or institutions. One could argue that ‘all’ learning that takes place outside organizations is, in fact, non-formal in character because it is not constrained by rules, ceremony or conventions. His idea is similar to those of the scholars referred to above, who also considered non-formal learning to take place outside a formal institution. All the above scholars appear to emphasize the fact that non-formal learning is an out-of institution, voluntary type of learning. However, voluntary learning can also occur within a school setting as extra-curricular activities. Thus, I have reservations about this ‘out-of-institution’ point of view. Instead, non-formal learning should not be seen as being bound by where the learning takes place. Following in the footsteps of Coombs and Ahmed, La Bella (1982) further developed the concept and characteristics and states that no formal learning can take place in schools in the form of extra-curricular activities. In contrast to the views of the scholars mentioned above, he goes on to say that the non-formal mode of learning can take place in formal, non-formal and informal educational settings. Concerning the autonomous nature of non-formal learning, La Bella confirms the view of other scholars that it is non-mandatory in nature, yet both teacher and learner have the intention to work towards a pre-planned goal. Taking into account the above views on no formal learning and its applicability to music learning scenarios, the following operational definition was developed.
- Non-formal learning is relatively systematic and pre-planned with an explicit intention on the part of both learner and mentor to accomplish a/some specific learning task(s). It is clear that non-formal learning involves some kind of guidance from a mentor. As this type of learning is voluntary, it is not like the compulsory education which is given at school, but this does not mean that the learning cannot take place in a school. In fact, non-formal learning can occur in any learning context. Many extra-curricular activities in schools can be regarded as non-formal learning. It should be noted that modes of assessment and intended learning outcomes have not been clearly outlined in non-formal learning. This indicates that measurable learning outcomes are not the main concern of non-formal learning, as they are in formal learning and formal education.

NON-FORMAL LEARNING: METHODS OF TRANSMISSION - MUSIC

The method of transmission in non-formal learning may be both aural-oral and by means of musical notation. In the aural-oral method, it is usual for traditional musicians to learn by following mentors' oral instructions and demonstrations. Yet the use of notation for learning is also possible when notation is used as a supplement to guidance by mentors. Notation is also used in other learning contexts, such as church and extra-curricular school music. However, a musician may begin by using an aural approach to copying music, or start by reading a score and later switch to the aural approach. A shift from reading a score to an aural approach is common. Bennett (1980) mentions the case of a piano player who first took classical piano lessons, but later joined a band in college. Being unable to play without a written score because of his previous training in music, the player started by using sheet music.

