(Re)defining learning design: a framework fit for the twenty-first century

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Abstract

Learning design as we know it is at a crossroads. Based on learning theories published almost a hundred years ago, it is designing for in-person learning and a student demographic that hasn't been seen since the 1950s. In the twenty-first century, and particularly post Covid-19, the field is long overdue for an update that puts blended and online learning at the forefront, addresses the inevitable link between the internet and education and responds to the changing demographics of learners in higher education. This paper will look at pedagogy and learning design through a modern lens with an aim to redefine the field and develop a new framework for learning design that is intuitive, inclusive, and grounded in the current century.

Introduction

The year is 2023, there is continuing conflict in Europe and we have endured a pandemic of unprecedented proportions. The fallout will be uncertain and mixed and will affect higher education (HE) for many years. The reality of how the sector coped with the pandemic remains to be seen clearly (and how it will cope with future upheaval is just as difficult to gauge), but much overdue are 1) a proper evaluation of the approaches used to design education with respect to our current situation and 2) appropriate adaptations of them, so we may be sure that they are flexible enough to cope with whatever future challenges may arise.

Despite this changing global landscape, HE is still using the same theories of pedagogy and learning design that have always been used. Learning design as a field is dominated by staff who, despite wide-ranging qualifications in pedagogy or technical fields, often sit in professional service divisions. Thus, there is a focus on delivery and technological solutions, rather than on academic research into the wider implications of learning design implementations. **The Top 100 Tools for Learning** (Hart, 2022) illustrates this point by providing a list of technologies, but offers no discussion about why or how they are used in education. Knowing that more people use Kahoot than use Mentimeter is perhaps useful in procurement, but the tools have different values from a pedagogical standpoint and are not interchangeable. From a learning design perspective, selecting the tool should be one of the last steps – not the key focus.

The top three tools (YouTube, PowerPoint, and Google Search) are not intended for – or designed for – education. There is a clear difference between retrospectively embedding pedagogy and designing a program with pedagogical practice at the forefront. To do the latter, you must understand the pedagogy and then prioritise the right tools for the job.

Furthermore, the sector needs to challenge the three-fold set of notions that are currently at the heart of the field: 1) that digital delivery and classroom delivery are somehow different; 2) that learning design is about technology; and 3) that learning design represents a new field. The EDUCAUSE Horizon Report (Pelletier *et al.*, 2021) lists learning design as 'emerging practice' yet it was comprehensively described, over ten years ago, as process, discipline, science and reality (Wagner, 2011) in the inaugural publication of ***The Journal of Applied Instructional Design***. Now, over a decade later, that description is hardly cutting-edge. Nevertheless, the rapid switch to online teaching precipitated by the pandemic gave many in HE their first real experience of online learning. This paper will outline core problems in language before reviewing learning design methodologies and key learning theories. The influence of design as a field will also be incorporated to address challenge 1 above and, finally, this paper will bring these disparate areas of knowledge together to create one theory of learning design that bridges pedagogical and technological concerns.

The problem

A major issue in discussing learning design is a lack of consistency in the profession: 'learning designer', 'instructional designer', 'academic developer' and 'learning technologist' are just some of the terms used to describe those working in the area. The community generally agrees that, across these roles, there is a continuum from a focus on technology to a focus on the educational narrative with many roles being a blend of the two (Katie Stripe, 2022), but, regardless of titles, the field of learning design is critical for the all of these roles and is fundamentally about the delivery of education.

Increasingly, the development of learning in the HE sector is carried out by multi-disciplinary teams (Hart, 2020), which include learning designers, project managers, subject matter experts and those responsible for technical components. The role of the learning designer is often to make sure other stakeholders (i.e., writers, sponsors, teachers, managers, *etc.*) understand why things are done in a specific way; however, there is no clear framework. This paper seeks to (re)define learning design as a field that works with and for a dynamic range of contributors; to do so, it will look critically at learning theory, learning design processes and general design principles and will outline a theory that focuses on education which incorporates digital tools rather than being driven by them.

Learning design methodology

A review of learning design methodologies failed to identify any grounded in pedagogy that provide a clear development framework covering the design, build, quality control and evaluation of a learning programme. With the rise of multi-disciplinary and geographically disparate teams, a learning design methodology combining a transparent process and clear roles, and also based on learning theory, is more important than ever.

Learning design has been described as "*the science of creating detailed specifications for the development, implementation, evaluation, and maintenance of situations*" (Wagner, 2011, p.34) in order to facilitate learning, a definition which further suggests that the field is very process-driven. Processes serve to maintain quality, which is beneficial, but the lack of an

explicit link to learning theory is a key failure of that definition. Table 1 below provides an overview of key learning design methodologies.

Table 1. Overview of different learning design methodologies

Model	Process
ADDIE	Analyse, design, develop, implement, evaluate
ASSURE	Analyse, state objectives, select media, utilise media, require performance, evaluate
Merril	Problem-centred, activation, demonstration (show me), application (let me), integration
Kemp	Determine goals, clarify content, define objectives, ensure logical sequence, design instructional strategies, plan instructional message/mode of delivery, develop assessment strategy, choose appropriate resources
Gagné	Preparation - gain attention, inform of objectives, recall prior learning Instruction and Practice - present content, provide guidance, practice, provide feedback Assessment - assess, enhance retention
Bloom	Remember, understand, apply, analyse, evaluate, create
ABC	Acquisition, investigation, practice, discussion, collaboration, production

The ADDIE model (Kurt, 2017) is a good overall approach, but a framework is needed for each element to make it a usable design checklist and to provide clear links to learning theory. Its similarity to waterfall project management (Thesing *et al.*, 2021) makes it a good choice for corporate training but less so for the iterative and multi-dimensional way HE content is developed.

The ASSURE model (Kurt, 2015), with its requirement for 'performance', makes it better in an educational setting than ADDIE, but it puts a heavy focus on media, materials and technology and it lacks guidance on how to develop those objects into learning content. 'Select and utilise media' is a useful step, but only if wrapped up in a pedagogical process like those of Kemp or Gagné (discussed below).

The non-linear approach of Merrill et al. (1996) sees application, demonstration, activation and integration sit around a problem-centred methodology which provides a very clear theory for designing a single learning object or lesson but does not provide a structure or process that can be used for developing a programme.

The Kemp (or Morrison, Ross and Kemp) model (Kurt, 2016) consists of nine core elements, which, when listed as they are in Table 1, don't make much sense. However, in their book Designing Effective Instruction (Morrison et al., 2010) the authors show these elements as interdependent. The lack of concrete steps poses a problem, by assuming that the reader understands the relationship between elements – not a given in a multi-disciplinary team. Nevertheless, 'ensure logical sequence', 'plan instructional message' and 'develop assessment strategy' are vital parts of the learning design process and should not be overlooked. Similarly, Gagné (Gagné et al., 1992) – especially when separated into preparation, instruction, and assessment – provides valuable ideas for constructing the instructional narrative, but is of limited help regarding the practicalities of building a unified whole.

ABC learning design (Young and Perovic, 2022), despite being from an educational research unit, makes no explicit reference to learning theory, so corroborating the earlier claim that learning design is primarily practice-focused. It relies heavily on discussions about the type of learning being undertaken, which, like Merrill, makes it more applicable to object design than programme development. ABC clearly leans heavily on Bloom's taxonomy (Bloom, 1956) which is also implicit in many of the models discussed. Nevertheless, Bloom, while still ubiquitous in HE, could be considered out of date on account of the way information is accessed and assimilated in the internet age.

While each of these methodologies have merit, there are overlooked elements. None reference the visual, verbal and signposting elements – from what is said by a classroom teacher to finding information on their virtual learning environment – that allow students to navigate the different elements of a blended course. Assessment is rarely discussed, and evaluation is sometimes used to mean 'quality assurance' and sometimes 'assessment of learning'.

Learning theory

Aubrey and Riley list seventeen learning theories in their book ***Understanding in and Using Educational Theories*** (Aubrey, 2019). While the scope of this paper prevents looking at them all in detail, below is a review of some of them in relation to their applicability to twenty-first century education.

Most seem to agree that learning is a community activity and communities of practice were first defined by Lave and Wenger (1991) as a group of people with a shared purpose or interest in a particular field. It was first defined after the invention of the 'world-wide web' and research into learning communities (and how they have developed as the internet becomes more prevalent) has kept pace. In fact, post Covid-19, the benefits of online communities have come to the forefront, not just for their educational value to students but in professional development for educators and as a support mechanism for adapting to change (Eddy *et al.*, 2022; Johnson *et al.*, 2019; Qutab *et al.*, 2022). Learning professionals need to navigate their own communities and be aware of those that students may enter. In addition, an understanding of how communities of practice (educational and professional) work and of how a student may move through them is vital to constructing a functioning course in the present century.

Like Vygotsky, many of those who wrote learning theories are psychologists who focus more on what might now be called learning science than on the delivery of education. The zone of proximal development (ZPD) (Vygotsky, 1978), his major work, describes how students move through cycles of knowing, on the basis of their interactions with more knowledgeable others. In the early twentieth century, a ZPD was restricted to the people and resources within physical reach. Now, a ZPD can be influenced by a variety of sources, which may provide conflicting information. The idea that there is a zone of learning, in which the learner needs assistance, is still valid, but the options for how that assistance can be delivered are now exceptionally broad. Learning design must anticipate where students may look for assistance and ensure that they have the resources and skills to navigate those zones.

Bandura (1977) popularised 'learning by observation' in the late 1970s; it meant watching and/or interacting with people physically. In the 1970s, this type of learning probably only

occurred in a ZPD but that cannot be considered true for a student today. Once again, the psychology is still valid, but the variety that can be observed now is hugely disproportionate to what students can comfortably navigate.

These theories, and many others, are child-centric, leaving adult learning under-discussed. By focusing on the psychologists who worked with children there is an implicit statement that learners in HE are children and should be taught as such. Malcolm Knowles' (1990) theories of adult learning should have a more central focus in HE. Knowles' three core principles – that: 1) adult learning is self-directed; 2) learners can and should be used as a classroom resource (meaning their experiences are a valid teaching tool); and 3) that learning is rooted in the real world (Thompson and Deis, 2004) – should be fundamental to learning design for HE.

Though each of these learning theories has merit, none is wholly fit for twenty-first century HE. Most base their research on children, a category of learners entirely separate from HE students, and instruction methods have changed dramatically since many of these theories were created. Students and teachers are no longer guaranteed to be in the same physical space, the internet has created new ways to access knowledge and post-Covid learning spaces show no sign of returning to a physical norm. While ideally more recent learning theories would have been included in this review, none is used with any regularity or has the same prestige within the community as those outlined here. The forty-year gap since many of these theories were designed highlights the necessity for re-evaluation.

Design

Contemporary institutions can no longer rely on one delivery method or physical teaching space. The more locations, tools and time zones you bring into a learning environment, the more important it becomes that the process is looked at holistically and designed with the users (both students and educators) in mind. Online components are now an inevitability in teaching, even if only as the gateway to face-to-face components. Therefore, regardless of the educational purpose, an online learning site is, fundamentally, a website. Three from the top five of the top 100 websites (Jefferies, 2020) – Google, Wikipedia and YouTube – are sites that also feature in *The Top Ten Tools for Learning* (Hart, 2022). In fact, YouTube is listed as the top tool for personal, workplace and education-based learning and has been ranked as such since 2016. This increasingly blurred boundary means that any online course components will be compared with more traditional webpages in terms of usability and access by both educators and students.

If online content is viewed as a website, it will be judged by the same standards, which means the following statements should be regarded as true for online educational content (SWEOR, 2021):

- It takes 50 milliseconds for a user to form an opinion;
- 94% of first impressions are design-related;
- 75% of people judge a company's credibility by the design of their website;
- 38% stop engaging if the content is unattractive;
- 88% of people are unlikely to return to a website if their user experience is bad.

Consequently, the impact of poorly presented content can render even the most prestigious professor far from credible in the eyes of students. Information on e-learning usability is limited and often reports negative feelings from users (Abuhlfaia and de Quincey, 2020) and, as with role definition, there are differences in terminology, such as 'user-centred design' (UCD) versus 'learner-centred design' (LCD) (Hasani *et al.*, 2020) which make the field more opaque. Since there are significant financial benefits for companies, there is a lot of commercial research into designing digital environments well. In an attempt to address the differences between UCD and LCD, Nielsen's general principles for design (Nielsen, 2020) have been adapted below for use within the proposed learning design framework:
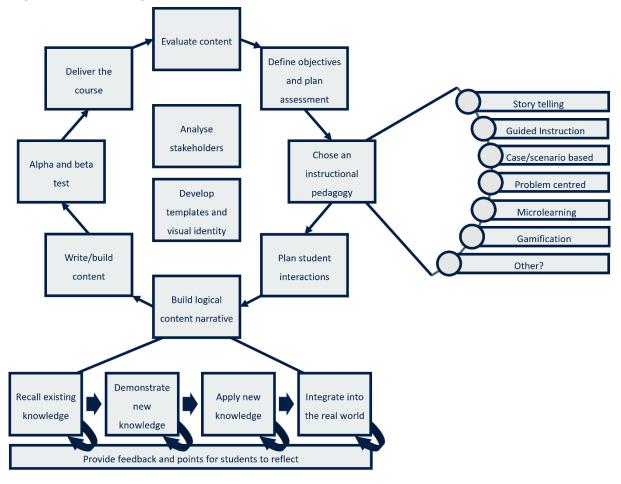
- Be consistent
- Signpost content
- Create links between systems and/or content
- Make navigation simple and intuitive
- Keep your presentation simple but attractive
- Provide access options where possible

Learning theory is not completely removed from design: when Biggs discusses constructive alignment in his 1996 paper, he does it in terms of learning design – additional proof that the concept is not new, nor exclusively the domain of online learning. Constructive alignment is simply the principle of designing education in such a way that the major components are interlinked, not at all dissimilar to the way website navigation is simplified by removing redundancies and creating consistent and intuitive links between elements.

A new process

A twenty-first century learning design methodology must include learning theory and good design and it must work across the different levels of a course; it must also be practical enough to work for a multidisciplinary team. The proposed process (figure 1) combines elements of learning theory with learning design methodologies to build a new framework which incorporates both. Development of a new course would begin with the definition of objectives and follow the cycle through to evaluation, where the process would begin again to check that all sections are still valid, on the basis of the outcomes of that evaluation. In instances where work is being done to redesign or repurpose existing content, it is likely that the process would start from the point of evaluating existing content. The central processes, as outlined below, are likely to be conducted before, or concurrently with, the first steps and without the same level of iterative review on a regular cycle.

Figure 1. New design process

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Central to the process: analyse stakeholders

Taking place before beginning the core cycle, a stakeholder analysis is central to the development process. Bean describes it as "*finding your hook*" and encourages learning designers to "*think like marketing and sales people*" (2014) while Laurillard looks at the theoretical requirements for learning in which students have preconceptions and personal goals and, to learn something new, they must have foundational knowledge (2012). Regardless of the approach, it is impossible to begin a design process without gathering information about your students. They are, after all, key stakeholders in education, but by no means the only ones.

Those developing and delivering the course are also important. Working within the needs and restrictions of your multi-disciplinary team is vital to the end product. If you do not value the development, training and strengths of teachers, you are building on unstable foundations (Stommel *et al.*, 2018).

There is, in addition to staff and students, an array of external stakeholders that should be considered. Institutional and industry-based policymakers have input into structure and content of curricula and the employability and skills needs of students could be an integral part of course design (Dallison *et al.*, 2021).

A well-designed programme needs to be responsive enough to adapt to student needs, whether personal (*i.e.*, neurodiversity and caring responsibility) or environmental (*i.e.*, the Covid-19 pandemic). Even the most thorough – and, practically speaking, impossible to conduct – analysis will not account for the changing minds, needs, and wishes of users, but it is not a wasted effort. A stakeholder analysis will broadly define who the students are, what communities they are part of and what pre-existing knowledge they have, as well as the constraints that come from staff commitments, budgetary requirements and what, if anything, is being expected of students in the future.

There are different approaches to conducting a stakeholder analysis, but limited examples of their being used in HE. In English for Academic Purposes (EAP), a stakeholder analysis is described as the requirement to understand what students individually need to achieve in the target language, what input is needed to achieve that and what they expect from the course (Shing and Sim, 2011). Communication needs are a natural priority as "*what learners are taught should be specifically what they will really use*" (Kaewpet, 2009, p.212). Understanding the language level of your students is vital to providing appropriate content in EAP – is HE so different?

A different, but nevertheless effective route, more akin to Bean's marketing approach, is an initial design workshop using the idea of user interface design personae to develop archetypes of typical students (Babich, 2017). Not only does this process provide information on the types of students the course is for, it can also be used to give visibility to minority groups and develop an inclusive curriculum (Stripe *et al.*, 2021).

Central to the process: develop templates

Like a stakeholder analysis, the development of templates sits centrally and is critical for delivery. It allows a programme to follow the core design principles adapted from Nielsen. Design and user experience do not need to reference learning theory, but there are educational implications for good design. If you see education delivery as a 'product', neuroscience and cognitive load theory (Sweller, 1988) can help make sense of implications such as user distraction. Teachers want to maximise student ability to deal with the content and avoid 'extraneous load' or the distractions caused by complexity in the presentation method.

Templates create consistency and allow learners to take advantage of visual cues, such as icons that highlight similar types of content across a programme. While it might seem that such aesthetics should be a finishing point, having templates from the beginning ensures that courses are consistent, easily navigable and structured around accessibility best practice.

The cycle itself

Once a stakeholder analysis and templates are in place, the cycle itself is sequential and iterative. Each section is dependent on the previous one and all are informed by the visual identity and the stakeholder analysis. The cycle should be applied to the whole programme and to each subsection within it (*e.g.*, curriculum, module, unit, lesson). On the basis of the

outcome of evaluation, the cycle should be repeated at the end of each delivery period. In reality, subsequent iterations will be more focused on updating content and making sure that it still fits the cycle than on developing content.

Develop objectives and plan assessment

The needs of the students and the required competencies should be addressed before the tools and the content details. The learning theories and the design frameworks mentioned above discuss teaching, student learning and how to build curricula, but they rarely discuss assessment. While an argument could be made that assessment does not equal learning, the fact remains that the HE is assessment-driven. By the process of constructive alignment, assessment must be directly related to the objectives, so it follows that they should be developed together. The development of objectives and assessment strategies are essential to building course content, which, in turn, should be driven by getting students to fulfil their objectives and be validated by the assessment. If a section of content does not relate directly to those things, it does not belong in the course.

Having no formal assessment does not absolve you of this step, it just shifts the perspective; formative and informal assessment are still valuable to learning and to a student's ability to see progress.

Choose an instructional pedagogy

Those delivery mechanisms listed in the graphic are just a selection and by no means exhaustive. Things like 'active learning' and 'flipped classrooms' would also be considered as instructional pedagogy. Different methods can and should be used for different aspects of a course, depending on the specific objectives.
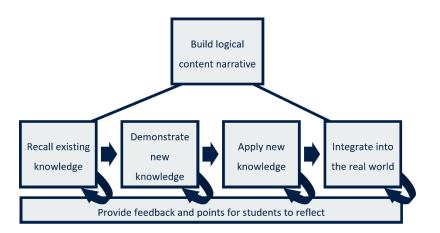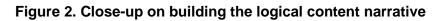
Plan student interactions

This section is where most of the design processes looked at earlier are lacking. Defining how, and when, students interact with each other, with instructors and with content is key to managing their learning and planning when and where resources may need to be applied. The learning theories are almost all about psychology and student interactions, but not one of the learning design frameworks discusses human interactions or how to develop and manage them effectively.

Interactions are not only human-to-human; interactions with content are also vital. Planning how students interact with different tools and sections of content and guiding them through the process is fundamental to meeting course objectives and navigating the information overload of the internet age.

Build a logical content narrative

A logical content narrative is the path which a student treads when moving through the zones of proximal development towards the goal of being able to carry out the course objectives unaided.

Figure 2. Close-up on building the logical content narrative

As well providing a logical order to content, this section looks at the processes of building a curriculum, recalling existing knowledge (either content you have already delivered or content that is part of your prerequisites) and then building on it to create new knowledge or develop new skills to be applied and integrated into real-world contexts, and ultimately the real world itself. Building feedback into each phase of learning allows teachers, and the students themselves, to see progress. This process needs to occur at every level from single lesson to full curriculum and, the bigger the programme, the more scaffolding and signposting are needed to enable students to navigate the programme effectively.

Student reflection is fundamental and could be considered an instructional pedagogy in itself; however, placing it in the development of a course narrative highlights the importance of giving students opportunities to reflect on their learning throughout the process.

Write/build content

In a multi-disciplinary team, the content itself may be written or delivered by a subject matter expert (SME) or a team of educators, but the learning designer should provide guidance. The way content is written depends on the presentation method; writing for different purposes is not innate and SMEs may need to be guided. Writing to templates not only helps the building of the content but also helps SMEs to write within the required structure.

There is no explicit section in this process which defines the media and technology used. The way content is delivered should be based on what is most relevant and what best helps students to meet their objectives. It is these objectives that should drive the choice of media and technology. In a fully online course, constraints come from what can be delivered asynchronously, but, in blended and face-to-face programmes, there are fewer restrictions. There are many theories about how create a blended programme effectively but, put simply, recall of existing knowledge is a passive process and may be assessed by an online quiz.

Integration into the real world is about how content is framed and, if you have the option to run a workshop, why wouldn't you?

Using pre-existing content, like a YouTube video, is not detrimental to a course; in fact, if it is properly incorporated into the course narrative, it can be extremely beneficial. Like placing a piece of art on the wall, if it is framed well and hung in the right place, it will enhance the room. Nevertheless, students need to know why each piece of content is there and told what they are expected to do with it. Regardless of the ratio between new content and existing media, it is imperative to plan how students will interact with it, set it in the logical place in the course narrative and construct the scaffolding that holds it all together.

Test and deliver

Testing and delivery are common features in all design methodologies, but never in learning theory. While it is true that in an online context more can technically go wrong, the main reason for testing content is to make sure it is coherent and appropriate. From an inclusion perspective, all content should be reviewed by a 'critical friend' from the 'non-dominant demographic' (Atcheson, 2021) to make sure no groups are being excluded. From a pedagogical perspective, an external voice will highlight any missed steps or assumptions that a novice will not be able to follow. Again, borrowing from corporate practices, nothing is released without first being user-tested and/or delivered as a pilot for live testing. Why should education be different?

Evaluation

Designing a unit of learning doesn't end with delivery. Education delivered online comes with a wealth of data, but, as any conclusions drawn would be purely inferential, a survey element should ideally be added. An overall evaluation plan needs to take a combined view of the data – both qualitative (student evaluation and feedback forms) and quantitative (*e.g.*, click data and quiz responses) – to see what amendments have been suggested, decide if they are reasonable or feasible and, if so, to make the changes for deployment the following cycle. This approach should also keep the content fresh, as any areas which are out of date will be updated accordingly.

Conclusion

There is no point in a building a learning design process for one single course; it has to be adaptable and future-proof. In many cases, this means integrating digital tools as "*technology has transformed our larger society. It has become central to people's reading, writing, calculating, and thinking*" (Collins and Halverson, 2009, p.2). Post Covid-19, there is significant truth in this assertion and educators must use technology effectively or risk not preparing students for a workforce where technology is integral. Learning design needs to move away from a focus on the tools used to present information and towards scaffolding content and developing skills for the future. This will serve to make education delivery more adaptable to changes in technology, such as the recent updates in generative AI, disciplinary changes

caused by technology and socio-political upheaval. Being more intentional in the way education supports and adapts to change will also benefit students in role-modelling adaptability and flexibility, both skills which will be vital to future employers (World Economic Forum, 2020).

By looking at learning design from a process perspective driven by learning theory, the changing digital landscape should not render the process obsolete. Instead, the framework proposed here should help educators to design adaptable programmes that provide students with a quality education regardless of the delivery mode. Nevertheless, this is not without issue. To someone with a pedagogical background, the links between learning theories and the proposed cycle will be implicit, at least in places. Links between 'plan student interactions' and communities of practice can easily be made and 'build a logical narrative' is based on Bloom's taxonomy, but these theories are no longer enough and user design in its various guises has grown in importance to the field.

Learning in HE is a multi-disciplinary endeavour and, in an ideal world, this process would be used by an educational professional to guide a range of stakeholders through design and delivery, with appropriate technical support for testing and implementation. In less ideal situations, subject experts could use this cycle as prompts for development, to enable them to consider some of the structure and features of a course without needing to be experts in design.

Unfortunately, education is rarely delivered purely for the joy of sharing knowledge, but, in a world of high tuition fees, student satisfaction surveys and competitive job markets, it is also as a means of developing business. As such, the learning design process must include aspects of quality control and make the process of designing and building education efficient. It must also be in line with legislation such as the Equality Act 2010 and the Web Accessibility Act 2018; there are legal implications to this, but learning design should strive to design education with accessibility and inclusion fully embedded, simply because it is the right thing to do. There is still work to be done to make inclusive education a mainstream norm, but having a design pedagogy such as the one described provides space to work to further aims of inclusion. It also gives those working in the field a model on which to build, so that there is more scope to start addressing the way learning design is communicated. This might, we may hope, then lead to the exploration of new learning theories and new pedagogies that are truly designed for the future learner.

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