



Academi Genedlaethol ar gyfer
Arweinyddiaeth Addysgol Cymru
National Academy for
Educational Leadership Wales



INSIGHT SERIES

Innovation in Welsh Educational Leadership: Are we playing not to lose when we should be playing to win?

Professor Emeritus Andy Penaluna
November 2021

agaa.cymru | nael.cymru

Introduction and scene setting

Regeneration should be at the heart of a new education system. The world of sustainability, enterprising people and innovators are the drivers of change, and in an ever-changing world, we need abilities to deal with issues we have yet to think about. The need for opportunity spotters, wicked problem solvers and action orientated thinkers has never been greater. With a new curriculum at hand, we have a choice. As any good sportsman will inform you, playing not to lose is quite different from playing to win, and you need to consider where the ball might be, not where it is now. Thinking for the future is a central tenet of playing to win, and connecting to our communities and stakeholders beyond education is essential.

In contrast, we have been used to a predominantly silo-based education system that rewards past events and predictable outcomes. It is an environment that bodies such as the OECD recognise to be stifling the very things that we need to develop in our learners. The lack of engagement with thinking outside of the education sector is especially evident, and perhaps surprisingly, the OECD reported that less externalised research is taking place in our secondary schools than in our primaries. If we don't look outwards, how can we develop education fit for the future?

Successful Futures is ready to be rolled out having engaged the thinking of many educators and experts, but still requires support for educators charged with making these changes, especially as they will be unfamiliar to many who have little experience of future orientated learning. The reform agenda also needs to constructively align what we value and what we evaluate. The importance of how we reward and recognise innovative abilities in our learners cannot be understated. The reasoning is two-fold, how do we advise them on their learning journey, and how do they recognise the progress that they have made?

Professional Standards and Leadership capability, when supported by policy, can move quickly. We can look to the future or look to the past, ideally both. What, for example, have we learned from the frequent reports that many of Wales' innovators dropped out or struggled in compulsory education? Is this a valid representation, or what can we learn from the persistent messaging that educational organisations need to nurture such talent? Can educational leaders and staff who don't demonstrate resilience, adaptive problem solving and insightful thinking, persuade their learners that it is the right thing to do?

In policy terms, we have to ask, has there been sufficient support for educational leaders? Has sufficient, quality assured and equitable professional learning been available, and is it reasonable to expect engagement when Covid-19 has put such considerable strain on educational organisations? As there has been some lag in terms of knowing how educational performance will be evaluated, and how learners will be assessed, in both formative and summative situations, what are the plans to support future orientated learning? What have we learned after having had to find alternatives to exams, and how can this knowledge be harnessed?

Questions such as these lie at the heart of developing inspiring educational leaders who can enrich lives.

Executive Summary

We live in what is commonly being termed a VUCA world, Volatile, Uncertain, Complex and Ambiguous, and this presents a number of challenges to those tasked with educational leadership, requiring cross disciplinary innovators who are leaders of change. Leaders will need to be able to take complex situations and explain them with clarity, quickly learn from misjudgements and reflect on alternative futures with imagination and insight. Flexibility and agility are the leadership mantra for tomorrow, and educational leaders need to become innovators who can motivate their teams to try and test new things.

Education is already changing around the world, and in Wales, *Successful Futures* heralds a bold new approach that will test and challenge us, it asks us to *unlearn* what is no longer valid and to look to questions that relate to *what matters*. For example, a lack of interdisciplinarity results in silo mentalities when most innovation results from joined up thinking, finding new connections and making links. Central to international concerns are reports that creativity in education has been in rapid decline, and that there is a demise in problem solving skills. Set this against a context where artificial intelligence will no longer require us to undertake work that can be standardised and repeated with ease, because these types of tasks are easy to automate. Two trains of thought have emerged that are initiating change, one related to the global sustainability agenda, and the other towards enterprise and entrepreneurship. Skills developed in these subjects intend to develop curious learners who discover challenges for themselves.

In order to effectively facilitate the introduction of the new curriculum, education leaders will need to have room to innovate. Innovation, however, takes many forms, and an understanding of the principals involved, together with experience of putting these into practice, is essential. Thus, opportunity recognition is no longer merely the domain of the intrepid entrepreneur but becomes a way of life for the new innovative education leader. Empowering the workforce to be creative and innovative with time and resources can have a positive impact on well-being and outcomes for all, especially if done in a collaborative manner. However, this requires role modelling and motivational strategies that inspire, enable and support new ways of thinking. Just as the creativity of learners is highly dependent on the creativity of their teachers, an innovative education organisation needs an innovative leader.

Skills Integral to the Four Purpose' are at the heart of the new Welsh Curriculum and are based on the desire to create different types of value in society. This goal aligns with well-being and regenerative thinking, especially important when considering sustainability issues and climate change, not to mention Wales's ground breaking Well Being of Future Generations Act (2015). Most UK Universities are now heavily engaged in research and practice that prepares their learners for the VUCA world and new ways of creating value. Scientific research into cognitive neurology supports the pedagogies that are evolving, and Welsh education organisations can draw on this research and experience and use it to inform leadership.

Two goals emerge from this discussion. Firstly, we need leaders who have a better understanding of what it means to be innovative. At the basic level, this means copying, modifying and adapting to initiate incremental change. However, Wales also needs radical innovators, ones who actively seek out new opportunities, make links themselves and provide clear exemplars of how to effect innovative change that can be understood by others.

Our *Four Purposes* need to remain central stage, thus at the higher level we need innovative policy makers who grasp the challenges set and support our education system through joined up thinking that encourages the lifelong learning approaches set out in *Successful Futures*. As is detailed, learning for hindsight can easily be tested as we know the answers already, but learning for foresight cannot be evaluated through similar approaches, simply because we are looking for newness of thought. In this context examination results will be lacking, as they only test the known.

For the National Academy for Educational Leadership this commentary illuminates some serious questions that have yet to be answered, and the recommendations provide insights into how we can all move forward... and play to win.

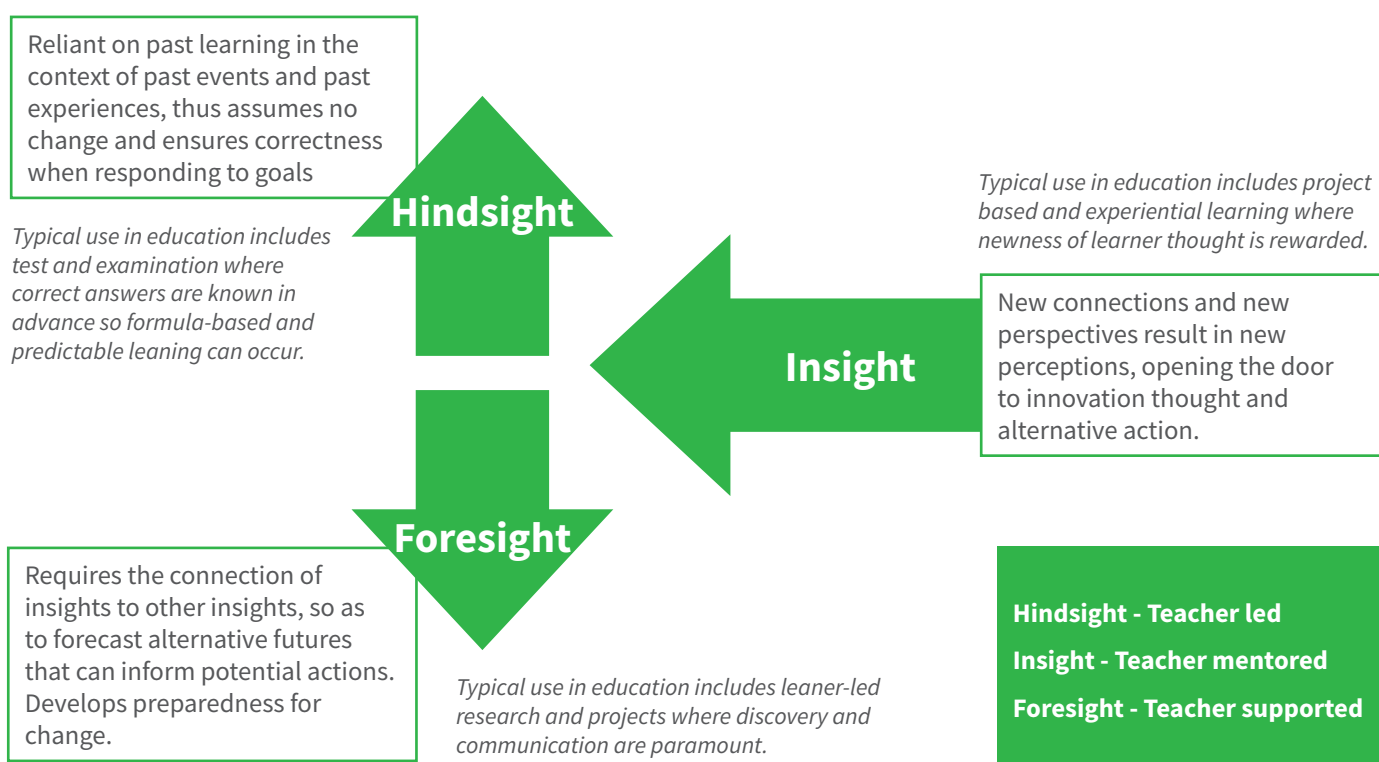
Professor Emeritus Andy Penaluna

November 2021

Some Essential Insights

Exacerbated by the global pandemic, we live in what is commonly being termed a VUCA world, Volatile, Uncertain, Complex and Ambiguous (See: VUCA World, 2020). This presents a number of challenges to those tasked with educational leadership, where there is an imperative to develop new cross disciplinary innovators who are leaders of change (Mars and Torres, 2018). Not least of these challenges is that the lessons of the past may no longer be valid when the pace of technological change is accelerating, it is becoming more difficult to plan when you cannot fully anticipate the future, and the notion of a 'correct' approach is undeterminable. In these circumstances *what* becomes less important than *why* and measuring against past norms becomes less valid than seeking out new future scenarios so that we can be as best prepared as we can be. A VUCA world challenges leaders to find new ways of doing things, to develop new goals that match their own contexts and above all, to not assume that they are the sole holder of knowledge. The leaders of the past were acknowledged for their knowledge and insight, but in a world where knowledge is easily accessible, knowledge harvesting, and talent harvesting takes centre stage.

In a learning and teaching environment, the benefits of hindsight, insight and foresight are easy to identify, and help us to visualise needs and shortfalls. As can be seen in the following diagram, a shift of emphasis that includes making new connections and thinking about the future is required, and this will impact on our perception of what a good education organisation looks like.



With hindsight we can explore how things were done and consider their applicability to current situations. With insight and constant horizon scanning into changes and trends we can see new opportunities and new ways of doing things. Ultimately a leader's goal is to develop foresight, so that they can offer potential ways forward when things change, develop adaptable approaches that respond to evolving scenarios and ensure that the same capacity develops within their own teams. This requires visionaries who have imagination, who can connect thought in new ways and convert resistance into energised positive new trajectories. This may mean more looking out, as well as looking into, why we educate - in order to scan for opportunities in our communities and contexts.

Leaders will need to be able to take complex situations and explain them with clarity, focusing on what counts whenever possible. Mistakes will be made, and lessons learned, so accounting for misjudgements and reflecting and reasoning needs to be handled with transparency. Flexibility and agility are the leadership mantra for tomorrow, and no more so than in education, because the responsibility to develop innovative capacity in others lies at the heart of what education should achieve. Regenerative future orientated thinking is needed to address the challenges that we, but more importantly our learners, will face. Sustainable futures need sustainable thinking.

In Wales *Successful Futures* heralds a bold new approach that will test and challenge us in this endeavour; this asks us to unlearn what is no longer valid and to look to questions that relate to *what matters*. We are constantly being reminded that the young learners of today may well be working in jobs that we cannot even imagine and be working in a circular economy where their career will probably take the form of a portfolio where change is a constant, and multiple job types are increasingly likely.

Universities are taking stock of the increasing likelihood of self-employment (Ball, 2019) as recent events and emerging research suggest that self-employment opportunities may be more prevalent than jobs. According to the Office of National Statistics (2020), between 2007 and 2014 self-employment represented the most significant employment opportunity, contributing around one-third to total employment growth. The unpreparedness of youth for the world of work is constantly vocalised, and what has been at the periphery of education in Wales has moved towards centrality of purpose.

Other research indicates that artificial intelligence will no longer require us to undertake work that is easily automated - because it can be standardised and repeated with ease. According to Massachusetts Institute of Technology, the alignment of job creation with productivity is already demonstrating the phenomena, showing that we have fewer jobs, and that people are falling behind because technology is advancing so fast, and our skills and organisations aren't keeping up. This is especially so in education, where preparation for a new type of economy should take precedent over the last one, due to the speed of change (Brynjolfsson and McAfee, 2014).

This throws into question the very validity of standards and normative working and highlights that educational leaders need to become innovators who can motivate their teams to do new things, so that their learners have the best opportunities possible to enjoy a fruitful and meaningful life. The World Economic Forum, whose strapline is "Committed to improving the state of the World", realized this over a decade ago:

Now more than ever we need innovation, new solutions, creative approaches and new ways of operating. We are in uncharted territory and need people in all sectors and at all ages who can "think out of the box" to identify and pursue opportunities in new and paradigm-changing ways.

(World Economic Forum, 2009)

Their Founder and executive Chairman Klaus Schwab has reflected on this new world and using World Economic Forum data predicts that as early as 2025 we will be using nanomaterials that are 200 times stronger than steel and a million times thinner than human hair. He also predicts the first transplant of a 3D-printed liver that year and suggest that 10% of all cars will be driverless (Schwab, 2017). In direct response, the World Economic Forum have questioned past practices, and amongst others, are asking what is now meant when we discuss quality in education? (World Economic Forum, 2020)

How does this pace of change match what is happening in Welsh education and the type of leadership required to make learning relevant? At the most basic of levels, consider what may happen in between the time a new learner joins an educational organisation and when they leave? The most unlikely scenario is that things will remain static. The Education Wales Careers and Work-Related Consultation Document (2021) sets out some preliminary thinking on how labour market information can inform educational developments; it included proposals on headteachers and their potential responsibilities. The recently published response document, is broadly supportive, and highlights that more work is needed in relation to the Welsh Government priority areas of:

- Well Being of Future Generations Act (2015)
- Environmental challenges
- Entrepreneurship
- Social Mobility
- Deprivation.

(Miller, 2022, 28)

Set this against the Institute of Welsh Affairs' research, which indicates that businesses who have wished to engage with the new curriculum have found it difficult to do so, and that they are unsure how they can contribute (IWA, 2019). The Federation for Small Business calls for more overt inclusion of enterprise education into each Area of Learning Excellence (AoLE), so as to help employability and new business development, especially in the small business sector (FSB, 2017 in IWA, 2019). Noting that our Minister for Education said that it was a challenge that she had not cracked (Williams in IWA, 2019), how can educational leaders move forward with any clarity of purpose? Can they collectively inform parents of the benefits of linking their educational and pedagogical approaches to opportunities that they may as yet have little understanding of?

IWA's vision is to create a Wales where everyone can thrive, and their research suggests that there is much to be done, not least in making learning more relevant and meaningful, and especially through evaluating learner progress through qualifications that are fit for purpose. This is a very uncertain landscape as Qualifications Wales have yet to clarify their intentions with regard to the Four Purposes and Skills Essential to the Four Purposes. How they align or not align will be significant, and this could present significant dilemmas for leaders. Will they once again have to prioritise examinations over demonstrated skills and abilities, or will new alignments between qualifications and the Four Purposes support and help them?

What is happening in response, and why does it matter to leadership in education?

There have been questions raised as to whether education remains fit for purpose for some time. Wyse and Ferrari (2015) reviewed creativity across European education, and whilst Wales performed better than many, they noted that creativity tended to be mentioned in opening sections but was rarely found in the detail of any subject other than the arts. The late Sir Ken Robinson (2006) asked if schools were killing creativity and research from the US suggested that creativity was indeed in rapid decline (Kim, 2011). The root of the problem appeared to be the accountability agenda and the fact that what was easily measured, relied on conformity and standardization that permitted comparisons to be made. Conversely, innovation by its very nature should surprise, so pre-determined goals as used in the metrics of the day could not capture learning impact in any meaningful way.

Two trains of thought emerged, one related to the global sustainability agenda as epitomised by the UN's Sustainable Goals (United Nations, 2015) whose goal 4 relates to education, and the other looked to innovation in business, where the terms enterprise and entrepreneurship took centre stage (United Nations, 2012; European Commission, 2006). UNESCO's International Commission on the Futures of Education (2021) conducted an international consultation that engaged a million people; they propose that in order to accommodate these insights, we need a new social contract that pushes us to reimagine our futures, in order to facilitate the profound changes required.

It should therefore come as no surprise to learn that in a research-led Higher Education environment, the Quality Assurance Agency for Higher Education decided to produce guidance material for Enterprise and Entrepreneurship education in 2012 (QAA, 2012; Updated 2018), and in partnership with the Higher Education Academy, followed it up with Education for Sustainable Development in 2014 (QAA and HEA, 2014), which was further refreshed in 2021. In January 2022 The European Joint Research Centre launched GreenComp to help educators to frame sustainable learning (Bianchi et al., 2022). These initiatives have advanced at some pace, with many Universities now commenting on them in their publicity material as reasons to apply. For schools, this recruitment agenda may offer new insights when it comes to preparedness for Higher Education. There is a consistent message in both these national guidance documents - within a circular economy, seeing ahead and future proofing in innovative ways is key to success.

The 2012 Programme for International Student Assessment (PISA) survey and subsequent Organisation for Economic Cooperation and Development 2018 report (OECD, 2018) noted the demise of problem-solving skills in 15-year-olds, and entrepreneurial education has been observed to be one of the fastest growing field of education that specifically addresses this shortfall (Sirelkhatim, Gangi and Nisar, 2015). However, when it comes to education in Europe, Eurydice (2016) reported that half of all EU countries had no associated guidance for teachers, despite policy guidance in all but nine Member States. Special note should be made of Eurydice's (2016) decision to list the UK countries separately as England was, and still is, one of the then nine Member States who had yet to develop an entrepreneurial education policy.

Scotland and Wales by comparison, were commended for their approaches to progression and comprehensiveness, and Wales are one the earliest adopters in Europe. The Welsh Youth Entrepreneurship Strategy (YES) from the Ministry for Business and Transport (now Business Economy and Innovation), had commenced in 2004 (Welsh Government, 2010). Although the Education Department had yet to formally engage, the first teacher training resulted from a consortium of Welsh Further and Higher Education experts joining forces in 2009 and culminated in specialist teacher training module at the University of Wales Trinity Saint David. The Welsh sector therefore has 10 years of experience in teacher training and offers Doctoral level study for educational leaders (EU Joint Research Centre, 2018). However, in the context of a national education system, this experience is rare, and as pointed out by Prof. Calvin Jones in his draft consultation document with the Future Generations Commissioner for Wales:

Few teachers will have direct, personal experience of multiple professions, or the gig economy and fragmented and insecure work to call upon in preparing teaching; all elements that are likely to characterise the working life of most of their pupils.

(Jones, 2019, 11)

Since 2015, supported by the Ministry of Education and Skills, similar lessons have helped to develop a new curriculum for Wales, one that moves from outputs to purposes, and from conformity towards innovation. A number of reports helped to facilitate this shift of emphasis. For example, in their discussion on Initial Teacher Training (ITT) Provision in Wales Furlong highlighted many challenges facing the profession. The greatest challenge was seen to be that:

“...the ‘teachers of tomorrow’ will have to respond to the changing nature of knowledge in society. In a world of rapid change, teachers will not only need to be experts in teaching something (history, chemistry or mathematics), they will also need to be experts in teaching their students to ‘learn how to learn’... This, we argued must be one of the key outcomes of students’ learning in the 21st century” (Furlong, 2015, 6).

The Welsh Baccalaureate’s Enterprise Challenge (Welsh Joint Education Committee, 2015) heralded the change, as this (now compulsory) school activity incorporates learning briefs from outside agencies and bodies and includes new ways of developing learners and assessing their performance. This is currently operational in all Welsh Secondary Schools and provides a springboard to develop further initiatives. However, teacher training and support has been limited, and assessment and evaluation metrics have not been fully embraced. Although not formally reported, the lack of understanding appears to have led to fragmented experiences for learners, depending more on the enthusiasm of the teacher than the clarity of reasoning. If true, this would mirror the experience in Finland, where school leaders’ claims of engagement were not born out in subsequent research (Järvinen et. al., 2014; Hämäläinen et. al., 2018), and the conclusion was reached that lack of leadership training was the most likely cause for concern.

Other research suggests that a lack of interdisciplinarity that results from silo mentalities is at least in part, to blame, and the structure of a team should embrace breadth, not just depth of thought. In his book ‘The Medici Effect’, Frans Johansson (2004) explains that innovation is more likely to happen when people of different backgrounds and experiences come together to solve problems, and that good managers look beyond their immediate team as and when required. This requires an educational leader to understand the innovative process, so that they can know what their own abilities are, know who which of their team members can do what, and know what motivates the team to learn in order to succeed. For example, bureaucracy is often cited as an obstacle, so a leader may have to shepherd their team and do their best not to prejudge success through burdensome checking points and mandated form filling. The metaphor of a plant developing a root system is helpful, because the more the plant is uprooted, the poorer root development will be.

A global perspective expressed by the Royal Society for the encouragement of Arts, Manufactures and Commerce (RSA) concurs, saying that “If transformation is to come from within education systems themselves, rather than left to market forces or developments in technology, then it will depend upon the emergence of a different kind of leadership... The aim must be to return teachers to the front and centre of the innovation process...” (RSA, nd).

To introduce an innovation and entrepreneurial culture within curriculum and assessment arrangements in schools (Donaldson, 2015), and education within initial teacher training (Furlong et al. 2006; Furlong, 2015) initial and continuous teacher training is aimed at educating educators within school as well as the further and higher education sector clearly has benefits (Penaluna et al. 2015; David et al. 2018). Until the formation of the National Academy for Educational Leadership in Wales, little appears to have been initiated to help educational leaders, though at an HE level, the National Centre for Entrepreneurship in Education could provide a model (NCEE, 2021).

Whilst terminologies that have evolved through different silos in education may differ, it was initially agreed early in the life of the new curriculum that young people need to develop a range of ‘wider skills’, which were perceived necessary for modern life and work - with the aim of making them more resilient able to cope with today’s and tomorrow’s challenges. Donaldson (2015, 42) references an NFER/Arad report citing Parsons and Beauchamp’s conclusion that,

Most high performing countries highlight problem solving, creative and critical thinking, selecting information, applying knowledge and drawing conclusions as the most prevalent skills identified.

Donaldson’s (2015) proposal advocated an ‘Areas of Learning and Experience’ (AoLE) structure for the entire age range from 3 to 16, that whilst acknowledging the importance of subjects and disciplines, proposed a grouping of six areas that would ensure cross pollination of learning.

- Expressive Arts
- Health and well-being
- Humanities
- Languages, literacy and communication
- Mathematics and numeracy
- Science and technology

This model was developed because it is widely accepted that most innovation takes place on the boundaries of disciplines as opposed to within the depth of a department or subject area, and that educational systems need to encourage multiple perspectives in order to become more adaptable and visionary. In the 'Great Debate' review of the new curriculum proposals (February-May 2015) some concerns were expressed regarding a potential reduction of rigour, identity and status in, for example, history classes. Many teachers were concerned that whilst the new freedom of autonomy that the curriculum would bring was very welcome, they would need support to learn to move beyond the prescriptive and silo nature of current approaches. However, concerns were also expressed about the current exam-laden approach that privileged summative assessment to the detriment of creativity and seemed to be driven by an accountability agenda as opposed to a learning and teaching agenda.

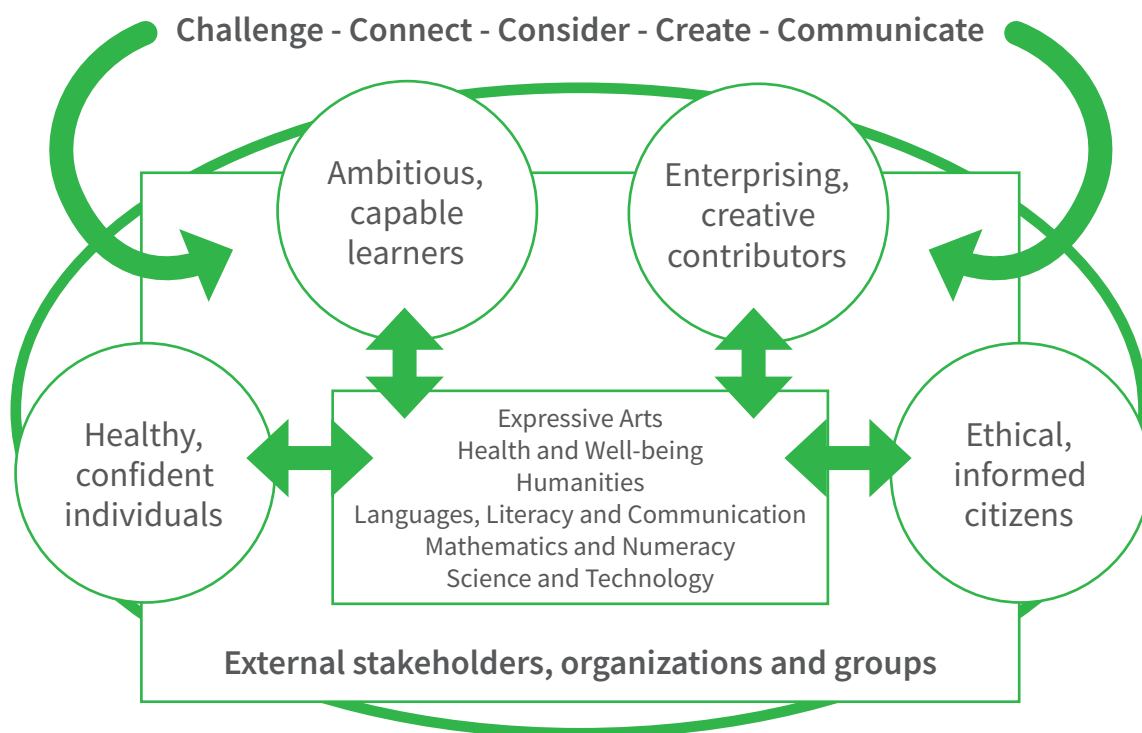
It can be argued that some Areas of Learning Excellence have greater experience of creativity, most prominently in the Arts. However, if we consider the notion of value creation inherent in Skills Essential to the Four Purposes, terms such as design thinking, as expressed in the Sciences, aligns well with the same goal despite the different terminology. Leaders may need to translate terms and make such alignments overt.

To return to Wales Strand 1, principles for wider skills were subsequently agreed and a draft model prepared to illustrate the principles and promote further debate with pioneer school representatives and Welsh Government in strand 2. Whilst not published as it was a discussion piece, the descriptors and model were as follows:

Wider Skills develop curious learners who will discover challenges. The development of a range of potential solutions (not just one) to a challenge facilitates novel connections between new knowledge and understandings. Prototypes facilitate reflection and consideration, and temporary failure informs new learning.

When developing new creations, the more novel a solution, the more complex it may be to communicate, so good reflection informs good communication. As ideas are never wholly right or wholly wrong, time, context and relevance inform their evaluation – what is right today may not be right tomorrow, which in turn inspires more curiosity.

Challenge norms - Connect new ideas - Consider the potential - Create novelty and value - Communicate to others.



Of particular relevance at this point of the new curriculum's development, is the 2016 European launch of EntreComp (Bacigalupo et al., 2016) and the perceived usefulness of broader entrepreneurial definitions than business start-up. The working group of Welsh teachers in the new curriculum's strand 1's work on wider skills found the framework extremely useful, especially in terms of competency development, stating that, "We have also begun to consider how elements of this framework could feed into our work as there are clear links between its key elements and our wider skills" (International Perspectives and Wider Skills Working Group, 2017, 9).

When pulled together, these discussions resulted in 'Skills Integral to the Four Purposes' (Welsh Government Hwb, 2020). At the heart of these is the desire to recognising, using and creating different types of value, under the for themes of:

- Creativity and innovation
- Critical thinking and problem solving
- Personal effectiveness
- Planning and organising

The themes are designed to assist assessment strategies as well as learning approaches. For example, divergent thinking is typically process evaluated as originality should surprise, whereas convergent and critical thinking is usually goal driven and can be assessed through carefully defined outcomes. This mirrors the work of the OECD, most specifically their 360Entrepreneurship guidance where assessment can be viewed as either Innovation or Implementation (Penaluna and Penaluna, 2015). Decisions on the associated metrics will impact on many approaches that are evolving. For example, at a recent learning festival at Cymbrogi Futures (2021) learner spokespersons were very clear that unless overtly supported, issues related to the circular and sustainable economy, desired by many in their generation, will fail to materialise.

According to recent reports from Qualifications Wales, the current Skills Challenge Certificate is to be replaced by a more manageable qualification that assesses the Integral Skills. However, this risks another disengagement with core areas of learning, where more traditional tests and examinations could drive assessment related to imitating the past. The Skills Integral to the Four Purposes were never intended to be a 'bolt on', but as the name suggests, a core tenet of learning. This may have impact beyond GCSE discussions and require informed change and associated communication from ESTYN (Jones, 2019).

For leaders these observations provide useful points of reference, because educators who are role models will most likely advance their organisations development more effectively if they take account of them themselves, as they are based on the 'very competencies' leaders need to demonstrate.

In summary, some key points are:

- There is evidence to suggest that developing creativity in education is either side-lined or overlooked, unless it is associated with the arts. Innovation requires imagination and creativity, whatever the discipline or subject area. Enterprising thinking and sustainability driven decision making are two clear examples of the need for more holistic approaches.
- Terminologies and specialist language found within disciplines may need to be translated by leaders, to assist alignment and future visioning.
- Entrepreneurial styles of education are leading the change and developing new metrics of success. International work on entrepreneurial education can offer many insights.
- Sustainability and enterprising creativity rely on an innovative mindset that connects education to real world problems, and it can be learned.
- Some limited Teacher Training has evolved, but leadership training is at a nascent stage.
- The new curriculum brings significant challenges in terms of leadership, especially when role modelling is required.
- Interdisciplinarity and seeing the views of others has been prioritised as a way forward by Welsh Government but has yet to be realised in qualification development.
- Recognition and reward mechanisms, both in educator support and learner support is potentially fragmented, and the lack of decisions on qualifications is of considerable concern – how can leaders operate if the metrics that evaluate them are not known, and what if the evaluation metrics don't overtly support creativity and innovation?

Moving forward to win: new needs and relevant points to consider

In terms of the roles of a new educational leader, the Growth versus Fixed Mindset from Stanford's Carol Dweck (Dweck, 2017) discussion, the OECD / EU Innovation versus Implementation debate (Penaluna and Penaluna, 2015), and motivational constructs that engender support are probably the most influential aspects that need to be considered during this transitional stage in Wales. As discussed, we must grow a new educational system that promotes life-long learning where a key ability will be the preparedness to innovate, because as things change in society, new problems arise and new solutions are required.

The lag of clear metrics from policy makers such as Qualifications Wales and ESTYN and messaging in terms of their own adoption and importantly, adaption, has led to uncertainty that threatens to derail some promising work. Clearly, if Welsh leaders fail to innovate and the status quo returns, we are only playing not to fail, according to metrics of the past. If this were to happen, educational leaders will respond to same demands as before, potentially side lining the very purposes Welsh education is supposed to embrace. Conversely, if the new metrics are a good fit to proposals, they will empower educational leaders to undertake the transformations required.

Innovation takes many forms, and an understanding of the principals involved, together with experience of putting these into practice is required. For example, iterative innovation where small steps are made may be useful but may not address central issues that may arise. In the famous quote by Henry Ford and the origins of the motor car, "If I asked them what they wanted, they would have said faster horses". The quote resonates with the task ahead, because society is in the midst of radical innovation, requiring a sea change of thoughts, approaches and reflective abilities.

In order to effectively facilitate the introduction of the new curriculum, leaders in education organisations will need to innovate themselves, as many challenges lay ahead and as a role model, they will most likely need to demonstrate the competencies themselves. The challenges will differ according to the type of organisation, the level of education and the needs of the learners. It could be argued for example, that Primary Schools will be more able to develop the heuristic approach called for by Donaldson than Secondary Schools, where subject specialisms and silos of experience are the norm. Some education organisations will be more engaged with their communities when it comes to immersing them in the learning required to become enterprising, whereas other organisations may have the advantage of, for example, an active governing body who bring their work-life experiences to bear, or better connections with innovations beyond the organisation.

The good news is that Wales is not alone, and many countries have already started their journeys. International initiatives from the OECD include developmental work on creativity in schools (OECD, 2019), and Wales has been engaged in some of the piloting. Interventions for higher education are also being developed, and models developed at University of Wales Trinity Saint David's International Institute for Creative Entrepreneurial Development (UWTSD-IICED) informed the process (OECD, 2016). The European Joint Research Centre (EU-JRC), have undertaken a number of reviews that reinforce the notion that creative learning should be seen as a form of learning that favours understanding over memorisation, and that it needs 'enablers' to thrive (Ferrari, Cachia and Punie, 2009). EU-JRC have also produced clear guidance on competencies required to become more innovative and entrepreneurial (Bacigalupo et. al., 2016), and have recently produced a literature review that highlights schools' practices that have been specifically designed to help to develop creativity, without which no innovation can occur (Venckutė et al., 2020).

The United Nations Conference on Trade and Development offer indicators of success in their Entrepreneurship Policy Framework (Mugione and Farinelli, 2012) and lessons learned in collaboration with the Commonwealth (UNCTAD and Commonwealth, 2014) suggest that learning should start early, and that innovative ability should be better supported through formative assessment. However, the eminent education expert Craft (2005) had already suggested that schools do not demonstrate the characteristics of innovative organisations, which are generally flexible, welcome ideas, are empowering, tolerate risk, celebrate success, foster synergy and encourage fun (Craft, 2005), which loops us back to role modelling and perceptions of leadership.

In Finland a review of leadership in schools from the Development Centre Opinkirjo's services for Finnish Schools and associated research have highlighted some weak points that they suggest need addressing (Järvinen et. al., 2014; Hämmäläinen et. al., 2018). These include creative problem solving, design education, entrepreneurship education, STEAM, thinking skills, participation and social skills. They propose that enhanced support in Problem-based learning and phenomena-based learning is required. In Iceland, their University Teacher training experts have identified a ski slope of declining creativity compared to an increased demand in creativity, innovation and entrepreneurialism (Jónsdóttir, 2017), and are actively working to address the shortfalls identified.

In the Balkans region, experimental work has been going on at all levels of education culminating in a set of learning outcomes for learners and learning outcomes for teachers too (For SEECCEL see Eurydice, 2016 and Global Entrepreneurship Network, 2016). There is even a framework for what an entrepreneurial school should look like. North Macedonia has

a compulsory Innovation and Entrepreneurship strand in their Primary and Secondary Education, which takes their learners from questions such as who am I and who is an entrepreneur, towards how do I lead creative enterprising people? (Polenakovikj, 2016)

The development of artificial intelligence and the demise of unskilled or standardized work that can be automated is the topic of much debate. The speed of development has increased since the Covid-19 pandemic and its need for social distancing. What is often overlooked is that adoption of new technologies has increased exponentially, for example on April 2nd, 2020, Venturebeat reported that the Zoom platform had ballooned from 10 million users to 200 million in only three months (Venturebeat, 2020).

Scientific research into cognitive neurology (Kounios and Jung-Beeman, 2009; Kounios et. al., 2006) supports the approaches that are developing, and help us to understand the shortfalls that arise when only clear and inflexible goals are set. These surmise that the learning brain needs to not only be efficient in terms of knowledge retention, but also plastic in terms of developing and adapting to meet new challenges. This and similar research enable educational leaders to develop approaches based on the science of brain development, and to lead in ways that encourage teachers and team members to understand what type of learning and assessment transforms any educational environment.

As previously noted, similar issues of leadership are being addressed in Higher Education through quality assurance and educator developments, and, for example, the National Centre for Entrepreneurship in Education, now in its 10th year of running its Entrepreneurial Leadership Programme, notes that, “Leaders at all levels in further and higher education require agile and creative leadership skills in order to lead effectively and respond to the rapidly changing environment” (NCEE, 2020).

Welsh education, therefore, does not stand alone, and can benefit from fuller engagement with those who are already meeting the challenges.

In summary:

- Policy makers and Leaders need to have a greater understanding of what innovation is and how it works at different levels, and in different contexts.
- Policy makers and Leaders need to look at how other countries are responding, how international bodies are offering support, and learn from them as they too respond to similar challenges that Welsh education faces.
- Policy makers and Leaders need to take on board what learning science and brain development science is telling us and use it to inform change.
- Policy makers and Leaders need to consider the changes that are already happening in the Higher Education sector, so that they can more readily align their efforts.
- Leaders need to develop lifelong learning abilities, so that they can better adapt to changing situations and become role models for their organisation.
- All of the above rely on the development of appropriate metrics from bodies such as Qualifications Wales and ESTYN, as if they fail to adapt and deliver, educational leaders will have to make decisions as to how far they move towards the Four Purposes.

Taking action to win – what next?

As educational leaders, we have been used to a system that has standardized education yet, is now faced with situations within which anything standardised can be automated. We need to be clear when correctness is required and known approaches will lead to success, however conversely, we also need to predict change and pre-prepare conceptual solutions that enable us to respond quickly and effectively when the situation demands. This requires an outward looking education that relates to the real world, and is overtly connected to it. As Kalle Mattila of Demos Helsinki suggests, this could even extend to questions such as who we teach, and why, because “In an ever-changing society, the answer is simple, yet challenging to execute: we need to teach the real world, to everyone, all of the time” (Mattila, 2017).

Just as the creativity of learners is highly dependent on the creativity of their teachers, an innovative educational organisation needs an innovative leader. *Successful Futures* is a once in a lifetime chance to align new ways of learning to new ways of leading, and to echo Einstein, new problems need new ways of solving them. One ‘tricky’ example is the use of exemplars and role models that can easily be recognised, especially if the innovation is already in education. There is an immediate attempt to copy and mimic rather than innovate. Whilst the small steps that result may have value, the educational leader has already confined their thinking. As Rigtering of Utrecht University reported as part of the Innovation Growth Lab (2018), providing examples could decrease the novelty and number of proposals. This observation suggests we need leaders who are encouraged to research, see beyond their own boundaries and disciplines, and seek out innovation wherever it may occur.

Co-creation, using systems learning that engages stakeholders beyond the organisation walls will bring great benefits, but requires people who are confident to collaborate, knowing their policy makers and educational leaders are behind them. In a practical sense, this may mean revisiting prohibitive rules so that engagement is not inadvertently pushed back – as was consistently reported by both staff and learners at the Festival of Learning at Cymbrogi Futures. Knowing the needs and perspectives of others is central to innovation, as without such insights creative thinking cannot be realistically applied.

We need tomorrow's adults to be able to design and shape an equitable, sustainable and socially progressive world. To enable them to do that, we need to fundamentally change the way they learn. And equip over-worked and under-resourced teachers with a sense of well-being and purpose (Cymbrogi, 2021).

The higher dimension is of course, that without innovative policy makers who are themselves informed, enabling them to seize the challenge and make special effort to ensure that validation metrics match the needs of future oriented education, the tail may continue to wag the dog, as what is assessed will become what matters, not the four purposes and associated skills that are intended to be central drivers. Uncertainty also has an effect on moral and well-being, so leadership in Wales needs clarity of what is expected (Jones, 2019). This extends to understanding the well-being of learners, to whom being ‘creative contributors’ is reward in itself.

The National Academy for Educational Leadership Wales seeks to ensure that practitioners are able to engage with the most relevant, meaningful and inspiring professional learning. With reference to our Call to Action (National Academy for Educational Leadership Wales, 2019), we want great innovative leaders who can thrive in the years ahead. We suggest that empowering the workforce to be creative and innovative with time and resources can have a positive impact on well-being and outcomes for all, especially if done in a collaborative manner and across all educational sectors, settings and levels.

Questions such as what can we imagine, what is viable, what is doable, and what will we learn are at the centre of this new journey. As collective Imagineering expert Rob Hopkins proposes, we need some space for educational leaders to imagine, a place for them to get together to share practices, and finally, we need to create pacts in their teams that can be used as exemplars of how to effect innovative change. During recent months, time to think has been in very short supply, and time to look beyond the obvious, to collaborate and to learn what needs to be learned has been overshadowed by events relating to Covid-19. Climate change and working environment change need to come back into focus.

This is our new Cynefin, but it is clear that Wales is not alone, but is one of the pioneers of educational reform that meets the demands of a Post Covid-19 learning environment. Where norms are constantly challenged, past approaches may no longer be fit for purpose and to put it simply, thinking has to take priority over remembering. Policy makers and leaders in Wales can look to these other international initiatives for advice and insights. The National Academy for Educational Leadership is already cognisant of many initiatives and can support such a goal.

Thus, opportunity recognition is no longer merely the domain of the intrepid entrepreneur or sustainability developer but becomes a way of life for the new innovative educational leader, supported by innovation-savvy policy makers. In the complexity of a VUCA world leaders simply won't know everything and will be highly reliant on their staff and broader stakeholder groups for intelligence gathering and proposed new ways forward. This requires role modelling and motivational strategies that inspire, enable and support new ways of thinking. The OECD's Schools as Learning

Organisation's Survey's (2017) insights into development in Wales are very insightful, especially when comparisons are made with Primary and Secondary provision.

To offer some specific insight, despite marked improvement on the OECD's 2014 report, where we find Primary Schools outperforming secondary schools at every level, most pertinent to our discussion are the dimensions that explore 'Establishing a culture of enquiry, exploration and innovation', and 'Creating and supporting continuous learning opportunities for all staff'. In a scale that runs from 3.6 to 4.4, Primary school's lead over secondary schools is double or more that of Secondary Schools. The clearest marker in this review could be 'Modelling and growing learning leadership', where Secondary schools are quite clearly under the threshold of figure of 4 points, whilst Primary Schools are well above it. "A culture of enquiry, innovation and exploration is underdeveloped in many schools, particularly in secondary schools... The SLO survey data found just 26% of secondary schools in our sample had established a culture of enquiry, exploration and innovation, compared to 63% of primary schools." (OECD's Schools as Learning Organisation's Survey's (2017), p8). The report also reinforces the need to collaborate more effectively with Higher Education institutions.

Culturally, an education system has to transform itself before it can transform the lives of its learners, and such transformation needs to be supported with clarity of purpose, so that its leadership in every educational organisation will thrive. This also has a well-being perspective, and as Wales has a ground breaking Well Being of Future Generations Act (2015), Calvin Jones report has particular relevance. In his White Paper Fit for the Future Education in Wales (2019), he concludes that in order to give our future citizens the opportunity to flourish, we need an ethically aware education environment where interpersonal and communications skills, especially those related to contexts beyond the classroom are valued as much as, if not more than, standardised examination results.

The current situation is somewhat ad hoc and heavily reliant on leaders who have taken it upon themselves to look outwards. Swansea's Craigfelen School is an excellent example of a proactive school who have created a local network of learning in nearly 40 schools, receiving recognition from the European Commission and the International Council for Small Business. In January 2020 headteacher Mrs Alison Williams received an MBE for her extensive commitment to teaching enterprising thinking; recognising her services to education and the community. Llanelli's Dafen School became the first 'whole school' to engage in EntreCompEdu, a 56-country initiative that, led by UWTSD's International Institute for Creative Entrepreneurial Development, offers practical solutions in terms of learner progression that can be mapped. Remembering that the EU EntreComp Framework on which this was based was well received within Phase 1 deliberations and subsequently by the teachers who have been introduced to it, no equivalent developmentally considered reference guidance is as yet available to teachers in Wales who are charged with transforming our learning environment. Why not?

This and previous insights lead to a series of recommendations, ones that we believe will help us all to ensure a successful future for Welsh education, through overtly embracing the challenges that lie ahead. We want to play to win.

Recommendations

1 That the National Academy for Educational Leadership collaborate with other middle tier organisations such as ESTYN and Qualifications Wales to gain further insights, findings and to ensure that an educational leadership voice is heard, and a coherent message on innovation in Welsh educational leadership can be offered.

2 That the National Academy for Educational Leadership is supported to enhance the development of research activity that enables leaders to not only see beyond education but provides published insights to relevant international developments that can be disseminated and discussed in specially designed events – enabling them to act as a conduit to the profession. This would supplement and further develop their introductory workshop sessions on innovative leadership, and the recognition schemes that they have started to implement, including EntreComp.

3 As the new curriculum presents many challenges and few boundaries are established, the National Academy for Educational Leadership should be supported to actively develop a series of ‘outlier projects’ that are potentially high risk, but challenge accepted norms, so that new insights ‘at the edges’ can be disseminated and considered.

4 That the National Academy for Educational Leadership should be supported to develop a means by which educational leaders become champions of interdisciplinarity. Ideally these champions should be seeking to find overlaps and help to develop provision that enhances relevance for the learners - for example working across the Areas of Learning Excellence and ensuring that the Skills Essential to the Four Purposes are integral to learning strategies.

5 Given the centrality of the Skills Essential to the Four Purposes, the National Academy for Educational Leadership could facilitate the development of insights on what they mean in practice, asking what challenges do they bring, what opportunities for innovative learning they could be offered to both educators and learners, and what metrics for evaluation and support could be devised?

6 Given the OECD findings on developing shared visions and developing a culture of inquiry, especially in the context of creating and supporting continuous learning for all staff, there is a clear need for educational leadership that transcends the current sector, setting, phase and silos of thought. Looking outward to harvest insights and feedback is key to this, and the well-being of our future generations. The National Academy for Educational Leadership could facilitate such developments and suggest how improvements can be made.

7 Educational leadership needs to collaborate more effectively with the university sector, and especially relevant in the context of this positioning paper, expertise relating to developing creative enterprising learners within Welsh HEIs could be drawn upon to accelerate progress. Given quality assurance guidelines exist in enterprise and sustainability in Higher Education through the Quality Assurance Agency for Higher Education, we recommend that as the National Academy for Educational Leadership has already engaged with experts involved in this work, it could facilitate this if supported to do so.

8 It is recommended that the National Academy for Educational Leadership triggers aligned networking opportunities. For example, drawing upon existing networks such as Big Ideas Wales, who already provide enterprise support to all levels of education. This in turn, would ensure policy coherence.

9 That the National Academy for Educational Leadership should have a responsibility for identifying and disseminating new international initiatives that have similar goals and ambitions to Wales.

References

- AdvanceHE (2019) Framework for Enterprise and Entrepreneurship Education. Online at: <https://www.advance-he.ac.uk/knowledge-hub/framework-enterprise-and-entrepreneurship-education>. Accessed 14th January 2022.
- Bacigalupo, M., Kampylis, P., Punie, Y., and Van den Brande, G. (2016), *EntreComp: The Entrepreneurship Competence Framework*. European Joint Research Centre, Seville. Online at: <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/entrecomp-entrepreneurship-competence-framework>. Accessed 14th January 2022.
- Ball, C. (2019) *Graduates in self-employment and microbusinesses*. Manchester, Graduate Prospects.
- Bianchi, G., Pisiotis, U. and Cabrera Giraldez, M. (2022) *GreenComp The European sustainability competence framework*, Punie, Y. and Bacigalupo, M. editor(s), EUR 30955 EN, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-46485-3, doi:10.2760/13286, JRC128040. Online at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC122016>. Accessed 15th January 2022.
- Brynjolfsson, E and McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. New York: W. W. Norton & Co.
- Craft, A. (2005). *Creativity in schools: tensions and dilemmas*. London: Routledge.
- Cymbrogi Futures (2021) Online at: <https://www.cymbrogi.org.uk> Accessed 12th January 2022.
- David, K., Penaluna, K., McCallum, E and Usei, C (2017) Embedding Entrepreneurial Skills development in Teacher Education, in James, J, Valdes-Cotera, R and J, Preece (eds) *Entrepreneurial Learning City Regions: Delivering on the UNESCO 2013, Beijing Declaration on Building Learning Cities*, Springer, Switzerland, pp. 319- 339.
- Donaldson, G (2015). *The Donaldson Review of Curriculum and Assessment*. Cardiff: Welsh Government.
- Dweck, C. (2017) *Changing the way you think to fulfil your potential (updated version)*. London: Robinson.
- Education Wales (2021) *Welsh Government Consultation Document – Careers and Work-Related Experiences*. Online at: https://gov.wales/sites/default/files/consultations/2021-05/careers-and-work-related-experiences-consultation-document_1.pdf. Accessed 17th January 2022.
- European Commission (2006) *The Oslo Agenda for Entrepreneurship Education in Europe*. Brussels: European Commission.
- EU-joint Research Centre (2018) *Entrecomp into action*. Resource document. European Commission. Online at: <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/entrecomp-action-get-inspired-make-it-happen-user-guide-european-entrepreneurship-competence>. Accessed 13th January 2022.
- Eurydice (2016) *Entrepreneurship Education at School in Europe*, Eurydice Report, Resource document. Resource document. European Commission. Online at: https://eacea.ec.europa.eu/national-policies/eurydice/content/entrepreneurship-education-school-europe_en. Accessed 12th January 2022.
- Ferrari, A., Cachia, R and Punie, Y. (2009) *Innovation and Creativity in Education and Training in the EU Member States: Fostering Creative Learning and Supporting Innovative Teaching*, Literature review on Innovation and Creativity in E&T in the EU Member States (ICEAC). Seville: EU-JRC.
- Furlong, J. (2015). *Teaching Tomorrow's Teachers: Options for the future of initial teacher education in Wales*. A Report to Huw Lewis, AM, Minister for Education and Skills. John Furlong, Initial Teacher Training Adviser to the Welsh Government March 2015. Resource Document. Online at: <https://www.cscjes-cronfa.co.uk/api/storage/4b992f03-a649-4b64-9615-baf4fea3d252/150309-teaching-tomorrows-teachers-final.pdf>. Accessed 3rd January 2022.
- Furlong, J., Hagger, H. Butcher, C. & Howson, J. (2006) *Review of Initial Teacher Training Provision in Wales: A report to the Welsh Assembly Government (the Furlong Report)*. Oxford: University of Oxford Department of Education.
- Future Generations Commissioner for Wales (2015) *Well Being of Future Generations Act*. Online at: <https://www.futuregenerations.wales/about-us/future-generations-act>. Accessed 15th January 2022.
- Global Entrepreneurship Network (2016) *The South East European Centre for Entrepreneurial Learning (SEECCEL)*. Resource document. Online at: <https://www.genglobal.org/snap/south-east-european-centre-entrepreneurial-learning-seecel>. Accessed 12th January 2022.
- Hämäläinen, M., Oikkonen, E and Pihkala, T. (2018) Principals promoting entrepreneurship education: The relationships between development activities and school practises. *Journal of Entrepreneurship Education*. Vol. 21, Iss. 2.
- International Perspectives and Wider Skills Working Group (2017). *January Interim Report*. Resource document. Welsh

Government. Online at: <https://gov.wales/docs/dcells/publications/170224-welsh-dimension-international-and-wider-skills-en.pdf>. Accessed 14th January 2022.

IWA (2019) Common Purposes: The implications of curriculum reform in Wales for further education, higher education, skills and business. Cardiff: Institute for Welsh Affairs. Online at: https://www.iwa.wales/wp-content/media/2019/02/20190104-IWA_CommonPurposes.pdf. Accessed 21st January 2022.

Järvinen, M., Kesler, M., & Ruskovaara, E. (2014) Teachers in basic and upper secondary education as users and creators of learning environments that promote entrepreneurship. In J. Seikkula-Leino, A. Tiikkala, & L. Yöntilä (Eds.), *Yrittäjyyskasvatusta suomalaisen opettajankoulutukseen ja opetukseen! – YVI-hankkeen hedelmiä vuosilta 2010–2014* (pp. 240–255). (Turun normaalikoulun julkaisuja; No. 1/2014). Turku: Turun normaalikoulu.

Johansson, F. (2014) *The Medici Effect: Breakthrough Insights at the Intersection of Ideas, Concepts, and Cultures*. Massachusetts: Harvard Business Review Press.

Jones, C. (2019) *Fit for the Future: Education in Wales*. White Paper, Cardiff Business School for the Office of the Future Generations Commissioner for Wales. Online at: https://www.futuregenerations.wales/resources_posts/education-fit-for-the-future-in-wales-report. Accessed 11th January 2022.

Jónsdóttir, S. (2017) Narratives of creativity: How eight teachers on four school levels integrate creativity into teaching and learning. *Thinking Skills and Creativity* 24 (2017) pp 127–139.

Kounios, J. and Jung-Beeman M. (2009), *The Aha! Moment: The Cognitive Neuroscience of Insight*, *Current Directions in Psychological Science*, Vol. 18, Iss. 4, pp 210–216.

Kounios, J., J. L. Frymiare, E. M. Bowden, I. Fleck, K. Subramaniam, Y. B. Parish and Jung-Beeman M. (2006) ‘The Prepared Mind: Neural Activity Prior to Problem Presentation Predicts Subsequent Solution by Sudden Insight’, *Psychological Science*, Vol. 17, Iss. 10, pp 882–890.

Kim, K. H. (2011) *The Creativity Crisis: The Decrease in Creative Thinking Scores on the Torrance Tests of Creative Thinking*. *Creativity Research Journal*, Vol 23, Iss. 4. pp 285-295.

Mars, M and Torres, M. (2018) *Developing Collegiate Student Proclivities to Entrepreneurial Leadership*. *Journal of Leadership Education*. Vol.7, Iss. 4. Online at: https://journalofleadershiped.org/jole_articles/developing-collegiate-student-proclivities-to-entrepreneurial-leadership. Accessed 14th January 2022.

Matiila, K. (2017) *In Finland, Rethinking Education*. Helsinki: Demos Helsinki. Online at: <https://www.sitra.fi/en/news/finland-rethinking-education>. Accessed 15th January 2022.

Miller (2022) *Consultation – Summary of responses to Careers and Work Related Experience (CWRE) Guidance*. Online at: <https://gov.wales/sites/default/files/consultations/2022-01/220111-summary-of-responses.pdf>. Accessed 17th January 2022.

Mugione, F, and Farinelli, F. (2012) *UNCTAD Entrepreneurship Policy Framework*. Geneva: United Nations Conference on Trade and Development. Online at: https://unctad.org/en/PublicationsLibrary/diaeed2012d1_en.pdf. Accessed September 14th January 2022

National Centre for Entrepreneurship in Education (2020) *Entrepreneurial Leadership*. Online at: <https://ncee.org.uk/leadership>. Accessed 14th January 2022.

National Academy for Educational Leadership Wales (2019) *Our Call to Action: Inspiring Leaders – Enriching lives*. Online at: <https://secureservercdn.net/160.153.137.40/485.648.myftpupload.com/wp-content/uploads/2019/03/National-Academy-Commission-Report-Our-Call-to-Action-EN.pdf>. Accessed 14th January 2022.

NCEE (2022) *National Centre for Entrepreneurship in Education: Entrepreneurial Leaders Programme*. Online at: <https://ncee.org.uk/programmes/leadership>. Accessed 14th January 2022.

OECD (2016) *OECD Meeting on fostering and assessing students’ creativity and critical thinking in Higher Education*. Online at: <http://www.oecd.org/education/ceri/Information%20Notes%20OECD%20meeting%20creativity%20and%20critical%20thinking%20in%20higher%20education.pdf>. Accessed 12th January 2020.

OECD (2018) *The Future of Education and Skills Education 2030: The Future We Want*, Resource document. Organisation for Economic Cooperation and Development. Online at: [https://www.oecd.org/education/2030/E2030%20Position%20Paper%20\(05.04.2018\).pdf](https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf). Accessed 10th January 2020.

OECD (2019) *Fostering Students' Creativity and Critical Thinking*

What it Means in School. Online at: <https://www.oecd.org/education/fostering-students-creativity-and-critical-thinking-62212c37-en.htm>. Accessed 12th January 2022.

OECD's Schools as Learning Organisations Survey's (2017). Online via Hwb at: https://hwb.gov.wales/api/storage/3c7ac963-4059-4f15-bdf9-368b16c3ecf7/developing-schools-as-learning-organisations-in-wales-highlights_0.pdf. Accessed 14th January 2022.

Office for National Statistics (2018) Trends in self-employment in the UK

Analysing the characteristics, income and wealth of the self-employed. London: ONS.

Penaluna, A., & Penaluna, K. (2015). Entrepreneurial Education in Practice, Part 2, Building Motivations and Competencies. Entrepreneurship 360 Thematic Paper. Resource document. OECD. <http://www.oecd.org/cfe/leed/Entrepreneurial-Education-Practice-pt2.pdf>. Accessed 14th January 2022.

Penaluna, K., Penaluna, A., Usei, C. & Griffiths, D. (2015). Enterprise education needs enterprising educators. *Education + Training*, 57 (8/9), 948-963.

Polenakovikj, R. (2019) Entrepreneurial Learning: formal vs. in- and non-formal education and training: The methodology matrix for entrepreneurship education in primary and secondary schools. Online at http://ee-hub.eu/component/attachments/?task=download&id=37:Matrix_Macedonia. Accessed 12th January 2022.

QAA (2012) Enterprise and entrepreneurship education: Guidance for UK higher education providers. Gloucester: Quality Assurance Agency for Higher Education.

QAA (2018) Enterprise and entrepreneurship education: Guidance for UK higher education providers (Updated) Gloucester: Quality Assurance Agency for Higher Education. Online at: http://www.qaa.ac.uk/docs/qaas/enhancement-and-development/enterprise-and-entrepreneurship-education-2018.pdf?sfvrsn=15f1f981_8. Accessed 3rd January 2022.

QAA and HEA (2014) Education for sustainable development: Guidance for UK higher education providers. Gloucester: Quality Assurance Agency for Higher Education. Online at: <https://www.qaa.ac.uk/quality-code/education-for-sustainable-development>. Accessed 14th January 2022.

Rigtering, C. (2018) How Does Managerial Framing Affect Intrapreneurship? Proceedings of the IGL Winter Research Meeting. London: NESTA. Online at: <https://www.nesta.org.uk/blog/new-experiments-are-shaping-way-we-think-about-innovation-entrepreneurship-and-growth>. Accessed 10th January 2022.

Robinson, K (2006) Do Schools Kill Creativity? Ted Talk online at: https://www.ted.com/talks/sir_ken_robinson_do_schools_kill_creativity. Accessed 3rd January 2022.

RSA (nd) Innovation in school systems – A global outlook, Royal Society for the encouragement of Arts, Manufactures and Commerce. Online at: <https://www.thersa.org/projects/archive/education/innovationinschoolsystems>. Accessed 10th January 2022.

Schwab, K. (2017) The Fourth Industrial Revolution. London: Portfolio Penguin

Sirelkhathim, F., Gangi, Y. & Nisar, T. (2015). Entrepreneurship education: A systematic literature review of curricula contents and teaching methods. *Cogent Business & Management*, 2. Online at: <http://doi.org/10.1080/23311975.2015.1052034>. Accessed 14th January 2022.

UNCTAD and Commonwealth (2014) The Policy Guide on Youth Entrepreneurship. Online at: <https://thecommonwealth.org/sites/default/files/press-release/documents/policyguideonyouthentrepreneurship.pdf>. Accessed 15th January 2022.

UNESCO International Commission on the Futures of Education (2021) Reimagining our Futures Together: A new social contract for education. Online at: <https://en.unesco.org/futuresofeducation>. Accessed 15th January 2022.

United Nations (2015) About the Sustainable Development Goals. Online at: <https://www.un.org/sustainabledevelopment/sustainable-development-goals>. Accessed 15th January 2022.

United Nations Conference on Trade and Development (2012) Entrepreneurship Policy Framework and Implementation Guidance. New York and Geneva: UNCTAD. Online at: https://unctad.org/system/files/official-document/diaeed2012d1_en.pdf. Accessed 15th January 2022.

Venckutė, M., Berg Mulvik, I. and Lucas, B. (2020) Creativity – a transversal skill for lifelong learning. An overview of existing concepts and practices., Bacigalupo, M., Cachia, R. and Kampylis, P. editor(s), EUR 30479 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-26938-0, doi:10.2760/493073, JRC122016. Online at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC122016>. Accessed 15th January 2022.

Venturebeat (2020), Zoom's daily participants jumped from 10 million to over 200 million. Online at: <https://venturebeat.com/2020/04/02/zooms-daily-active-users-jumped-from-10-million-to-over-200-million-in-3-months>. Published April 2nd, 2020. Accessed 15th January 2022.

VUCA World, (2020) Online at: <https://www.vuca-world.org>. Accessed 15th January 2022.

Welsh Government (2010). Youth Entrepreneurship Strategy: An action Plan for Wales, Resource document. Welsh Government. Online at:

https://businesswales.gov.wales/bigideas/sites/bigideas/files/documents/YES-%20An%20Action%20Plan%20for%20Wales%202010-15%20_Eng_1.pdf. Accessed 15th January 2022.

Welsh Government Hwb (2020) Online at: <https://hwb.gov.wales/curriculum-for-wales/designing-your-curriculum/developing-a-vision-for-curriculum-design>. Accessed 15th January 2022.

World Economic Forum, (2009) Educating the Next Wave of Entrepreneurs Unlocking entrepreneurial capabilities to meet the global challenges of the 21st Century: A Report of the Global Education Initiative. Geneva: World Economic Forum.

World Economic Forum (2020) Schools of the Future: Defining New Models of Education for the Fourth Industrial Revolution. Geneva: World Economic Forum.

Wyse, D. and Ferrari, A. (2015) Creativity and Education: Comparing the national curricula of the states of the European Union with the United Kingdom. British Educational Research Journal. Vol. 41(1), 30–47.



Academi Genedlaethol ar gyfer
Arweinyddiaeth Addysgol Cymru
National Academy for
Educational Leadership Wales

agaa.cymru | nael.cymru