

Literature based Note on Digital Transformation of Education and Sustainability

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Abstract: The goal for its implementation is to increase value through innovation, invention, customer experience or efficiency. Digitization is the process of converting analog information into digital form using an analog-to-digital converter, such as in an image scanner or for digital audio recordings. As usage of the internet has increased since the 1990s, the usage of digitization has also increased. Digital transformation, however, is broader than just the digitization of existing processes. Digital transformation entails considering how products, processes and organizations can be changed through the use of new, digital technologies. Digital transformation can be seen as a socio-technical programme.

Key words : Digitization; Analog; Digital Converter; Digital Transformation; Communication;

Introduction

In the field of evaluation, and in particular educational evaluation, the Joint Committee on Standards for Educational Evaluation has published three sets of standards for evaluations. The Personnel Evaluation Standards were published in 1988, The Program Evaluation Standards (2nd edition) were published in 1994, and The Student Evaluation Standards were published in 2003. Each publication presents and elaborates a set of standards for use in a variety of educational settings. The standards provide guidelines for designing, implementing, assessing and improving the identified form of evaluation. Each of the standards has been placed in one of four fundamental categories to promote educational evaluations that are proper, useful, feasible, and accurate. In these sets of standards, validity and reliability considerations are covered under the

accuracy topic. For example, the student accuracy standards help ensure that student evaluations will provide sound, accurate, and credible information about student learning and performance. In the UK, an award in Training, Assessment and Quality Assurance (TAQA) is available to assist staff learn and develop good practice in relation to educational assessment in adult, further and work-based education and training contexts.

Summary table of the main theoretical frameworks

The following table summarizes the main theoretical frameworks behind almost all the theoretical and research work, and the instructional practices in education (one of them being, of course, the practice of assessment). These different frameworks have given rise to interesting debates among scholars.

Topics	Empiricism	Rationalism	Socioculturalism
Philosophical orientation	Hume: British empiricism	Kant, Descartes: Continental rationalism	Hegel, Marx: cultural dialectic
Metaphorical orientation	Mechanistic/Operation of a Machine or Computer	Organismic/Growth of a Plant	Contextualist/Examination of a Historical Event
Leading theorists	B. F. Skinner (behaviorism)/Herb Simon, John Anderson, Robert Gagné: (cognitivism)	Jean Piaget/Robbie Case	Lev Vygotsky, Luria, Bruner/Alan Collins, Jim Greeno, Ann Brown, John Bransford
Nature of mind	Initially blank device that detects patterns in the world and operates on them. Qualitatively identical to lower animals, but quantitatively superior.	Organ that evolved to acquire knowledge by making sense of the world. Uniquely human, qualitatively different from lower animals.	Unique among species for developing language, tools, and education.
Nature of	Hierarchically organized	General and/or specific	Distributed across people,

<p>knowledge (epistemology)</p>	<p>associations that present an accurate but incomplete representation of the world. Assumes that the sum of the components of knowledge is the same as the whole. Because knowledge is accurately represented by components, one who demonstrates those components is presumed to know</p>	<p>cognitive and conceptual structures, constructed by the mind and according to rational criteria. Essentially these are the higher-level structures that are constructed to assimilate new info to existing structure and as the structures accommodate more new info. Knowledge is represented by ability to solve new problems.</p>	<p>communities, and physical environment. Represents culture of community that continues to create it. To know means to be attuned to the constraints and affordances of systems in which activity occurs. Knowledge is represented in the regularities of successful activity.</p>
<p>Nature of learning (the process by which knowledge is increased or modified)</p>	<p>Forming and strengthening cognitive or S-R associations. Generation of knowledge by (1) exposure to pattern, (2) efficiently recognizing and responding to pattern (3) recognizing patterns in other contexts.</p>	<p>Engaging in active process of making sense of ("rationalizing") the environment. Mind applying existing structure to new experience to rationalize it. You don't really learn the components, only structures needed to deal with those components later.</p>	<p>Increasing ability to participate in a particular community of practice. Initiation into the life of a group, strengthening ability to participate by becoming attuned to constraints and affordances.</p>
<p>Features of authentic assessment</p>	<p>Assess knowledge components. Focus on mastery of many components and fluency. Use psychometrics to standardize.</p>	<p>Assess extended performance on new problems. Credit varieties of excellence.</p>	<p>Assess participation in inquiry and social practices of learning (e.g. portfolios, observations) Students should participate in assessment process. Assessments should be integrated into larger environment.</p>

Controversy

Concerns over how best to apply assessment practices across public school systems have largely focused on questions about the use of high-stakes testing and standardized tests, often used to gauge student progress, teacher quality, and school-, district-, or statewide educational success.

No Child Left Behind

For most researchers and practitioners, the question is not whether tests should be administered at all—there is a general consensus that, when administered in useful ways, tests can offer useful information about student progress and curriculum implementation, as well as offering formative uses for learners. The real issue, then, is whether testing practices as currently implemented can provide these services for educators and students. President Bush signed the No Child Left Behind Act (NCLB) on January 8, 2002. The NCLB Act reauthorized the Elementary and Secondary Education Act

(ESEA) of 1965. President Johnson signed the ESEA to help fight the War on Poverty and helped fund elementary and secondary schools. President Johnson's goal was to emphasize equal access to education and establish high standards and accountability. The NCLB Act required states to develop assessments in basic skills. To receive federal school funding, states had to give these assessments to all students at select grade level. In the U.S., the No Child Left Behind Act mandates standardized testing nationwide. These tests align with state curriculum and link teacher, student, district, and state accountability to the results of these tests. Proponents of NCLB argue that it offers a tangible method of gauging educational success, holding teachers and schools accountable for failing scores, and closing the achievement gap across class and ethnicity. Opponents of standardized testing dispute these claims, arguing that holding educators accountable for test results leads to the practice of "teaching to the test."

Additionally, many argue that the focus on standardized testing encourages teachers to equip students with a narrow set of skills that enhance test performance without actually fostering a deeper understanding of subject matter or key principles within a knowledge domain.

High-stakes testing

The assessments which have caused the most controversy in the U.S. are the use of high school graduation examinations, which are used to deny diplomas to students who have attended high school for four years, but cannot demonstrate that they have learned the required material when writing exams. Opponents say that no student who has put in four years of seat time should be denied a high school diploma merely for repeatedly failing a test, or even for not knowing the required material. High-stakes tests have been blamed for causing sickness and test anxiety in students and teachers, and for teachers choosing to narrow the curriculum towards what the teacher believes will be tested. In an exercise designed to make children comfortable about testing, a Spokane, Washington newspaper published a picture of a monster that feeds on fear. The published image is purportedly the response of a student who was asked to draw a picture of what she thought of the state assessment. Other critics, such as Washington State University's Don Orlich, question the use of test items far beyond standard cognitive levels for students' age. Compared to portfolio assessments, simple multiple-choice tests are much less expensive, less prone to disagreement between scorers, and can be scored quickly enough to be returned before the end of the school year. Standardized tests (all students take the same test under the same conditions) often use multiple-choice tests for these reasons. Orlich criticizes the use of expensive, holistically graded tests, rather than inexpensive multiple-choice "bubble tests", to measure the quality of both the system and individuals for very large numbers of students. Other prominent critics of high-stakes testing include Fairtest and Alfie Kohn. The use of IQ tests has been banned in some states for educational decisions, and norm-referenced tests, which rank students from "best" to "worst", have been criticized for bias against minorities. Most education officials support criterion-referenced tests (each individual student's score depends solely on whether he answered the questions correctly, regardless of whether his neighbors did better or worse) for making high-stakes decisions.

21st century assessment

It has been widely noted that with the emergence of social media and Web 2.0 technologies and

mindsets, learning is increasingly collaborative and knowledge increasingly distributed across many members of a learning community. Traditional assessment practices, however, focus in large part on the individual and fail to account for knowledge-building and learning in context. As researchers in the field of assessment consider the cultural shifts that arise from the emergence of a more participatory culture, they will need to find new methods of applying assessments to learners.

Large-scale learning assessment

Large-scale learning assessments (LSLAs) are system-level assessments that provide a snapshot of learning achievement for a group of learners in a given year, and in a limited number of domains. They are often categorized as national or cross-national assessments and draw attention to issues related to levels of learning and determinants of learning, including teacher qualification; the quality of school environments; parental support and guidance; and social and emotional health in and outside schools.

Assessment in a democratic school

The Sudbury model of democratic education schools do not perform and do not offer assessments, evaluations, transcripts, or recommendations. They assert that they do not rate people, and that school is not a judge; comparing students to each other, or to some standard that has been set is for them a violation of the student's right to privacy and to self-determination. Students decide for themselves how to measure their progress as self-starting learners as a process of self-evaluation: real lifelong learning and the proper educational assessment for the 21st century, they allege. According to Sudbury schools, this policy does not cause harm to their students as they move on to life outside the school. However, they admit it makes the process more difficult, but that such hardship is part of the students learning to make their own way, set their own standards and meet their own goals. The no-grading and no-rating policy helps to create an atmosphere free of competition among students or battles for adult approval, and encourages a positive cooperative environment amongst the student body. The final stage of a Sudbury education, should the student choose to take it, is the graduation thesis. Each student writes on the topic of how they have prepared themselves for adulthood and entering the community at large. This thesis is submitted to the Assembly, who reviews it. The final stage of the thesis process is an oral defense given by the student in which they open the floor for questions, challenges and comments from all Assembly

members. At the end, the Assembly votes by secret ballot on whether or not to award a diploma.

Assessing ELL students

A major concern with the use of educational assessments is the overall validity, accuracy, and fairness when it comes to assessing English language learners (ELL). The majority of assessments within the United States have normative standards based on the English-speaking culture, which does not adequately represent ELL populations. Consequently, it would in many cases be inaccurate and inappropriate to draw conclusions from ELL students' normative scores. Research shows that the majority of schools do not appropriately modify assessments in order to accommodate students from unique cultural backgrounds. This has resulted in the over-referral of ELL students to special education, causing them to be disproportionately represented in special education programs. Although some may see this inappropriate placement in special education as supportive and helpful, research has shown that inappropriately placed students actually regressed in progress.

It is often necessary to utilize the services of a translator in order to administer the assessment in an ELL student's native language; however, there are several issues when translating assessment items. One issue is that translations can frequently suggest a correct or expected response, changing the difficulty of the assessment item. Additionally, the translation of assessment items can sometimes distort the original meaning of the item. Finally, many translators are not qualified or properly trained to work with ELL students in an assessment situation. All of these factors compromise the validity and fairness of assessments, making the results not reliable. Nonverbal assessments have shown to be less discriminatory for ELL students, however, some still present cultural biases within the assessment items.

When considering an ELL student for special education the assessment team should integrate and interpret all of the information collected in order to ensure a non biased conclusion. The decision should be based on multidimensional sources of data including teacher and parent interviews, as well as classroom observations. Decisions should take the students unique cultural, linguistic, and experiential backgrounds into consideration, and should not be strictly based on assessment results.

Universal screening

Assessment can be associated with disparity when students from traditionally underrepresented groups are excluded from testing needed for access to

certain programs or opportunities, as is the case for gifted programs. One way to combat this disparity is universal screening, which involves testing all students (such as for giftedness) instead of testing only some students based on teachers' or parents' recommendations. Universal screening results in large increases in traditionally underserved groups (such as Black, Hispanic, poor, female, and ELLs) identified for gifted programs, without the standards for identification being modified in any way.

- Confidence-based learning accurately measures a learner's knowledge quality by measuring both the correctness of his or her knowledge and the person's confidence in that knowledge.
- E-scape, a technology and approach that looks specifically at the assessment of creativity and collaboration.
- Educational aims and objectives
- Educational evaluation deals specifically with evaluation as it applies to an educational setting. As an example it may be used in the No Child Left Behind (NCLB) government program instituted by the government of the U.S.
- Electronic portfolio is a personal digital record containing information such as a collection of artifacts or evidence demonstrating what one knows and can do.
- Evaluation is the process of looking at what is being assessed to make sure the right areas are being considered.
- Grading is the process of assigning a (possibly mutually exclusive) ranking to learners.
- Health impact assessment looks at the potential health impacts of policies, programs and projects.
- Macabre constant is a theoretical bias in educational assessment
- Educational measurement is a process of assessment or an evaluation in which the objective is to quantify level of attainment or competence within a specified domain. See the Rasch model for measurement for elaboration on the conceptual requirements of such processes, including those pertaining to grading and use of raw scores from assessments.
- Program evaluation is essentially a set of philosophies and techniques to determine if a program "works".

- Progress testing
- Psychometrics, the science of measuring psychological characteristics.
- Rubrics for assessment
- Science, technology, society and environment education
- Social impact assessment looks at the possible social impacts of proposed new infrastructure projects, natural resource projects, or development activities.
- Standardized testing is any test that is used across a variety of schools or other situations.
- Standards-based assessment
- Robert E. Stake is an educational researcher in the field of curriculum assessments.
- Writing assessment
- Metric fixation

Accreditation

Accreditation is the independent, third-party evaluation of a conformity assessment body (such as certification body, inspection body or laboratory) against recognised standards, conveying formal demonstration of its impartiality and competence to carry out specific conformity assessment tasks (such as certification, inspection and testing). Accreditation bodies are established in many economies with the primary purpose of ensuring that conformity assessment bodies are subject to oversight by an authoritative body. Accreditation bodies, that have been peer evaluated as competent, sign regional and international arrangements to demonstrate their competence. These accreditation bodies then assess and accredit conformity assessment bodies to the relevant standards. An authoritative body that performs accreditation is called an 'accreditation body'. The International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC) provide international recognitions to accreditation bodies. There are many internationally recognized accreditation bodies approved by the IAF and ILAC.

The Emirates International Accreditation Centre (EIAC) is the largest accreditation body in Middle East region, whereas in South Asia the Pakistan National Accreditation Council (PNAC) and National Accreditation Board for Testing and Calibration Laboratories (NABL), Quality Council of India (QCI) are the largest. In East Asia, the China National Accreditation Board is the largest, while the United Kingdom Accreditation Service

(UKAS) is the largest in Europe. The National Association of Testing Authorities (NATA) and the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) being the largest in the Oceania region, with the South African National Accreditation System being the largest in Africa. For most of the accreditation schemes, international standards issued by the International Organization for Standardization (ISO) are used.

Accreditation processes are used in a wide variety of fields:

- Accredited investor
- Accredited in Public Relations
- Accredited registrar
- Construction
- Diplomatic accreditation
- Educational accreditation
 - Higher education accreditation
 - ACGME (USA)
 - List of recognized higher education accreditation organizations
 - List of unrecognized higher education accreditation organizations
 - Accreditation mill
 - List of unaccredited institutions of higher learning
 - Pre-tertiary education accreditation
- Email sender accreditation
- Food safety
 - Global Food Safety Initiative
- Health & Safety Compliance (UK)
- Healthcare
 - American Association for Accreditation of Ambulatory Surgery Facilities
 - Accreditation Commission for Health Care
 - Electronic Healthcare Network Accreditation Commission
 - Emirates International Accreditation Centre (EIAC)
 - International healthcare accreditation
 - Commission on Accreditation of Rehabilitation Facilities
 - Hospital accreditation

- Joint Commission (USA)
- United Kingdom Accreditation Forum
- Information assurance
- Personal trainer accreditation
- Professional certification
- Systems engineering
- Translating and interpreting
 - National Accreditation Authority for Translators and Interpreters (Australia)
- Sustainability
 - Sustainable Forest management such as the Forest Stewardship Council (FSC)
 - Sustainable fishing such as the Marine Stewardship Council (MSC)
 - Sustainable aquaculture such as the Aquaculture Stewardship Council (ASC)
 - Sustainable tourism such as the Global Sustainable Tourism Council (GSTC)

Accreditation standards

Many accreditation bodies, such as the UKAS, EIAC, EGAC, PNAC, IAS, NABCB operate according to processes developed by the ISO as specified in ISO/IEC 17011. Accredited entities in specific sectors must provide evidence to the accreditation body that they conform to other standards in the same series:

- ISO/IEC 17020: "General criteria for the operation of various types of bodies performing inspection" (2012)
- ISO/IEC 17021-1: "Conformity assessment. Requirements for bodies providing audit and certification of management systems" (2015)
- ISO/IEC 17024: "Conformity Assessment. General requirements for bodies operating certification of persons" (2012)
- ISO/IEC 17025: "General requirements for the competence of testing and calibration laboratories" (2017)

Community education

It is also known as **community-based education** or **community learning & development**, is an organization's programs to promote learning and social development work with individuals and groups in their communities using a range of formal and informal methods. A common defining feature is that programmes and activities are developed in dialogue with communities and

participants. The purpose of community learning and development is to develop the capacity of individuals and groups of all ages through their actions, the capacity of communities, to improve their quality of life. Central to this is their ability to participate in democratic processes.

- Community education encompasses all those occupations and approaches that are concerned with running education and development programmes within local communities, rather than within educational institutions such as schools, colleges and universities. The latter is known as the formal education system, whereas community education is sometimes called informal education. It has long been critical of aspects of the formal education system for failing large sections of the population in all countries and had a particular concern for taking learning and development opportunities out to poorer areas, although it can be provided more broadly.
- There are a myriad of job titles and employers include public authorities and voluntary or non-governmental organisations, funded by the state and by independent grant making bodies. Schools, colleges and universities may also support community learning and development through outreach work within communities. The community schools movement has been a strong proponent of this since the sixties. Some universities and colleges have run outreach adult education programmes within local communities for decades. Since the seventies the prefix word 'community' has also been adopted by several other occupations from youth workers and health workers to planners and architects, who work with more disadvantaged groups and communities and have been influenced by community education and community development approaches.
- Community educators have over many years developed a range of skills and approaches for working within local communities and in particular with disadvantaged people. These include less formal educational methods, community organising and group work skills. Since the nineteen sixties and seventies through the various anti poverty programmes in both developed and developing countries,

practitioners have been influenced by structural analyses as to the causes of disadvantage and poverty i.e. inequalities in the distribution of wealth, income, land etc. and especially political power and the need to mobilise people power to effect social change. Thus the influence of such educators as Paulo Friere and his focus upon this work also being about politicising the poor.

- In the history of community education and community learning and development, the UK has played a significant role in hosting the two main international bodies representing community education and community development. These being the International Community Education Association, which was for many years based at the Community Education Development Centre based in Coventry UK. ICEA and CEDC have now closed, and the International Association for Community Development, which still has its HQ in Scotland. In the 1990s there was some thought as to whether these two bodies might merge. The term community learning and development has not taken off widely in other countries. Although community learning and development approaches are recognised internationally. These methods and approaches have been acknowledged as significant for local social, economic, cultural, environmental and political development by such organisations as the UN, WHO, OECD, World Bank, Council of Europe and EU.

Achievement through learning for adults

Raising standards of achievement in learning for adults through community-based lifelong learning opportunities incorporating the core skills of literacy, numeracy, communications, working with others, problem solving and information communications technology (ICT).

Achievement through learning for young people

Engaging with young people to facilitate their personal, social and educational development and enable them to gain a voice, influence and place in society.

Achievement through building community capacity

Building community capacity and influence by enabling people to develop the confidence, understanding and skills required to influence decision making and service delivery.

Principles and competences

Competent CLD workers will ensure that their work supports social change and social justice and is based on the values of CLD. Their approach is collaborative, anti-discriminatory and equalities-focused and they work with diverse individuals, communities of place or interest when this is or is not appropriate. Central to their practice is challenging discrimination and its consequences and working with individuals and communities to shape learning and development activities that enhance quality of life and sphere of influence. They have good interpersonal and listening skills and their practice demonstrates that they value and respect the knowledge, experience and aspirations of those involved.

The Scottish Government have introduced the following set of principles of which community learning and development related activities should be based on:

1. Empowerment – increasing the ability of individuals and groups to influence issues that affect them and their communities;
2. Participation – supporting people to take part in decision making;
3. Inclusion, equality of opportunity and anti-discrimination – recognising that some people may need additional support to overcome the barriers they face;
4. Self-determination – supporting the right of people to make their own choices; and
5. Partnership – recognising that many agencies can contribute to CLD to ensure resources are used effectively.

Wisconsin Model

A philosophical base for developing Community Education programs is provided through the five components of the Wisconsin Model of Community Education. The model provides a process framework for local school districts to implement or strengthen community education. A set of Community Education Principles was developed by Larry Horyna and Larry Decker for the National Coalition for Community Education in 1991 These include:

1. Self-determination: Local people are in the best position to identify community needs and wants. Parents, as children's first and most important teachers, have both a right and a responsibility to be involved in their children's education.

2. **Self-help:** People are best served when their capacity to help themselves is encouraged and enhanced. When people assume ever-increasing responsibility for their own well being, they acquire independence rather than dependence.
3. **Leadership Development:** The identification, development, and use of the leadership capacities of local citizens are prerequisites for ongoing self-help and community improvement efforts.
4. **Localization:** Services, programs, events, and other community involvement opportunities that are brought closest to where people live have the greatest potential for a high level of public participation. Whenever possible, these activities should be decentralized to locations of easy public access.
5. **Integrated Delivery of Services:** Organizations and agencies that operate for the public good can use their limited resources, meet their own goals, and better serve the public by establishing close working relationships with other organizations and agencies with related purposes.
6. **Maximum Use of Resources:** The physical, financial, and human resources of every community should be interconnected and used to their fullest if the diverse needs and interests of the community are to be met.
7. **Inclusiveness:** The segregation or isolation of people by age, income, sex, race, ethnicity, religion, or other factors inhibits the full development of the community. Community programs, activities, and services, should involve the broadest possible cross section of community residents.
8. **Responsiveness:** Public institutions have a responsibility to develop programs and services that respond to the continually changing needs and interests of their constituents.
9. **Lifelong Learning:** Learning begins at our birth and continues until death. Formal and informal learning opportunities should be available to residents of all ages in a wide variety of community settings.

Role of the professional

The role of a community learning and development professional depends somewhat on the career path followed. For example, someone working with young people may have different priorities than someone working with adults; however, the

outcomes are very similar in a sense that both will be aiming to promote a more socially just and equal society. Community learning and development is a vast field of work and the range of job categories is wide and may include the following: Youth Information Worker, Detached Youth Worker, Community Arts Worker, Community Capacity Worker, Local Authority Community Planning Officer, etc. Community learning and development workers should see themselves as working with people, rather than for them. Empathy is crucial to understanding the issues faced by those they work with and it is important that they engage in a way that does not intimidate people or place the worker in a position of looking down on those they work with.

The role of a Community learning and development worker is largely different from the role of a formal educator such as a teacher. Community learning and development workers do not follow a curriculum, as they allow the people they work with to form their own way of learning and each individual is believed to have the ability to reach their full potential in life. A community learning and development approach is arguably a more effective way of learning as every individual has their own unique way to learn and community learning and development workers look for the best possible method that suits the individual. Community learning and development approaches are gradually being adopted in schools to some extent and many other agencies and using a community learning and development approach in their work. In Canada, a university in Alberta has created a Community-based Bachelor of Education program to prepare teachers for rural community education, making it the first university program in Canada that aims at preparing teachers for rural community education.

Qualifications

Professional community educators or community learning and development workers usually hold a professional degree in community education or community learning and development, depending on the course offered at the university from which they graduate. In Scotland, qualifications may be Approved by the Standards Council for Community Learning and Development. This means that the course has been assessed by a group of peers - an Approval Panel. The course must have a practice element totalling 40% of the course to gain Approval. More details on the Approval Process and a list of Approved qualifications are available on the Standards Council website www.cldstandardscouncil.org.uk In order to gain entrance to this course, a history of voluntary work

is usually desirable. Many of those working in the field of community learning and development will be doing so voluntarily. These people are usually encouraged to complete a work-place based alternative to the full-time degree course. Others in paid positions may hold qualifications relevant to the field. These people will also be encouraged to study for a degree in community education. Some university institutions offer post-graduate degrees in community education such as MA, MSc, PGDip, PGCert, etc.

Youth participation

In countries where democratic governments exist, people are encouraged to vote for someone to represent them. In today's society there is a dwindling interest in politics from our younger generation and this could have a negative effect on our democracy and political system in years to come. Community learning and development has the potential to encourage young people to become more interested in politics and helping them influence decisions that affect their lives. In many parts of the world, youth parliament-style organisations have been set up to allow young people to debate issues that affect them and others in their community. Young people engage with these organisations voluntarily and are sometimes elected using a democratic system of voting. Young people are at the heart of these organisations and are usually involved in the management and development. The majority of these organisations are facilitated and staffed by workers trained in community learning and development; however, staff role is mainly to facilitate and be supportive but not intrusive. These organisations allow young people to gain a voice, influence decision makers who affect their lives and provide them with a sense of self-worth and a place in society. In the United Kingdom, examples of these organisations include the United Kingdom Youth Parliament (UKYP); in Scotland, the Scottish Youth Parliament (SYP); in Wales the Children & Young People's Assembly for Wales; and in Northern Ireland, the Northern Ireland Youth Forum. In Canada, examples include Youth Parliament of Manitoba (YPM), Saskatchewan Youth Parliament (SYP), TUXIS Parliament of Alberta (TUXIS), and British Columbia Youth Parliament (BCYP).

Parental participation

Cultural divides and deficit thinking creates mutual distrust between marginalized parents and schools which in turn creates barriers to active parental involvement of marginalized parents in the education of their children. Researches also show that parents of high socio-economic status play active and direct role in the education of their

children and are more likely to influence school policies that affects their children's schooling whereas parents of low socio-economic status play indirect roles in the education of their children and are less likely to influence school policies that affects their children's schooling. The gap between parents' educational involvement among parents from higher socio-economic status and parents from lower socio-economic status results in a more personalized education that caters for the needs of children from higher socio-economic backgrounds and more alienating and generic education systems/policies for students from low socio-economic backgrounds. The following practices are necessary for parent and community participation in the education of their wards to be effective; students come to school healthy and ready to learn, parents assist schools with financial and or material support, there are frequent communications between parents and school authorities, parents have meaningful authorities in the schools and they also assist in the teaching of their children. Parents' home based educational involvement such as creating an enabling learning environment at home, helping their children with their assignments, helping their children develop cognitive skills and other school skills and motivating their children to do well in school supports student success. Researches show that multimodal and effective migrant parental involvement in the education of their children increases the test scores of such students and also shows strong student success even after academic abilities and socio-economic status are taken into consideration.

School officials' racial stereotypes, class stereotypes, biases and attitudes regarding parental involvement in the education of their children hinders school officials from involving parents as partners in the education of their children. Also, bureaucracies in the public education systems hinders parents from advocating for changes that would benefit their children. Formally organized parental associations in schools that seeks to increase parental involvement, ignore the cultural and socio-economic needs of minorities, thereby contributing to the barriers of parental involvement, especially for marginalized parents. Research shows that high number of marginalized parents do not actively engage in their children's schooling. There is also a wide gap between the rhetoric of best parental involvement practices and actual parental involvement practices. Effective parental involvement in the education of their children involves; parenting, communication, volunteering, home tutoring, involvement in decision-making, and collaboration with the community. Effective Parental Involvement treats and or makes school

officials and parents partners in the education of their children.

Sustainability

It is a societal goal that broadly relates to the ability of people to safely co-exist on Earth over a long time. Specific definitions of sustainability are difficult to agree on and have varied in the literature and over time. The concept of sustainability can be used to guide decisions at the global, national, and individual levels (e.g. sustainable living). Sustainability is commonly described as having three dimensions (also called pillars): environmental, economic, and social. Many publications state that the environmental dimension (also called "planetary integrity" or "ecological integrity") is the most important, and, in everyday usage, "sustainability" is often focused on countering major environmental problems, such as climate change, loss of biodiversity, loss of ecosystem services, land degradation, and air and water pollution. Humanity is now exceeding several "planetary boundaries" There are many barriers to achieving sustainability that must be addressed for a "sustainability transition" to become possible. Some barriers arise from nature and its complexity.

"Sustainability can be defined as the capacity to maintain or improve the state and availability of desirable materials or conditions over the long term". "Sustainability is the long-term viability of a community, set of social institutions, or societal practice. In general, sustainability is understood as a form of intergenerational ethics in which the environmental and economic actions taken by present persons do not diminish the opportunities of future persons to enjoy similar levels of wealth, utility, or welfare." "Sustainability means meeting our own needs without compromising the ability of future generations to meet their own needs. In addition to natural resources, we also need social and economic resources. Sustainability is not just environmentalism. Embedded in most definitions of sustainability we also find concerns for social equity and economic development."

Conclusions

Education for Sustainable Development means including key sustainable development issues into teaching and learning; for example, climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It also requires participatory teaching and learning methods that motivate and empower learners to change their behaviour and take action for sustainable development.

References

- [1]. "What is collaborative learning?". spiral.ac. Archived from the original on 3 August 2016. Retrieved 5 June 2016.
- [2]. Al Januszewski A.; Molenda Michael. (2007) Educational Technology: A Definition with Commentary ISBN 978-0805858617
- [3]. Al-Asfour, A (2012). "Online Teaching: Navigating Its Advantages, Disadvantages and Best Practices". Tribal College Journal of American Indian Higher Education. **23**: 3.
- [4]. Aleksej Heinze; Marie Griffiths; Alex Fenton; Gordon Fletcher (2018). "Knowledge exchange partnership leads to digital transformation at Hydro-X Water Treatment, Ltd". Global Business and Organizational Excellence. **37** (4): 6–13. doi:10.1002/JOE.21859. ISSN 1932-2054. Wikidata Q56622208.
- [5]. Alsheail, Abdulrahman (2010). Teaching English as a Second/Foreign Language in a Ubiquitous Learning Environment: A Guide for ESL/EFL Instructors (PDF). (Master's Project). Archived from the original (PDF) on 7 February 2014. Retrieved 2 April 2016.
- [6]. Andone, Diana; Holotescu, Carmen; Grosseck, Gabriela (26 November 2014). 2014 International Conference on Web and Open Access to Learning (ICWOAL). pp. 1–4. doi:10.1109/ICWOAL.2014.7009244. ISBN 978-1-4799-5739-2. S2CID 15404201.
- [7]. Anna Fazackerley (22 November 2016). "Universities and NUS plan boycott of flagship teaching rankings". The Guardian.
- [8]. Annetta, Leonard; Mangrum, Jennifer; Holmes, Shawn; Collazo, Kimberly; Cheng, Meng-Tzu (12 May 2009). "Bridging Realty to Virtual Reality: Investigating gender effect and student engagement on learning through video game play in an elementary school classroom". International Journal of Science Education. **31** (8): 1091–1113.
- [9]. Ant Bagshaw (22 June 2017). "TEF results – What the panel statements say, and don't say". Wonkhe. Retrieved 24 June 2017.

- [10]. Avis, Peter (9 October 2014). "1973-1977 The National Development Programme NDPCAL". Educational Technology. Archived from the original on 6 January 2017. Retrieved 7 November 2014.
- [11]. Baker, Celia (4 January 2013). "Blended learning: Teachers plus computers equal success". Desert News. Archived from the original on 23 October 2013. Retrieved 30 January 2014.
- [12]. Bates, A. (2005). *Technology, e-Learning and Distance Education*. London: Routledge.
- [13]. Bates, A. and Poole, G. *Effective Teaching with Technology in Higher Education* San Francisco: Jossey-Bass/John Wiley, 2003
- [14]. Benno, Mark (29 November 2016). "Virtual Reality". *Gifted Child Today*. **21** (1): 12–14. doi:10.1177/107621759802100104. S2CID 220121504.
- [15]. Biocchi, Michael. "Games in the Classroom". *Gaming in the Classroom*. Archived from the original on 15 August 2011. Retrieved 24 March 2011.
- [16]. Biruni, Muhammad ibn Ahmad; Sachau, Eduard (1910). *Alberuni's India. An account of the religion, philosophy, literature, geography, chronology, astronomy, customs, laws, and astrology of India about A.D. 1030*. London: K. Paul, Trench, Trübner & Co.
- [17]. Bowdon, Melody A. (1 January 2014). "Tweeting an Ethos: Emergency Messaging, Social Media, and Teaching Technical Communication". *Technical Communication Quarterly*. **23** (1): 35–54. doi:10.1080/10572252.2014.850853. ISSN 1057-2252. S2CID 145413489.
- [18]. Brochu, Michèle (2018). "Projet SEUR" (PDF). *Rapport d'Activités*: 37. Archived (PDF) from the original on 2 January 2019. Retrieved 2 January 2019.
- [19]. Bughin, Jacques; et al. (9 February 2017). "The case for digital reinvention". Archived from the original on 2017-02-09. Retrieved 9 October 2021.
- [20]. Butt, Aurangzeab; Imran, Faisal; Kantola, Jussi; Helo, Petri (2021). "Cultural Preparation for Digital Transformation of Industrial Organizations: A Multi-case Exploration of Socio-technical Systems". *Advances in Physical, Social & Occupational Ergonomics. Lecture Notes in Networks and Systems*. Vol. 273. pp. 457–463. ISBN 978-3-030-80712-2. S2CID 237298363.
- [21]. Cassidy, Margaret (2004). *Book Ends: The Changing Media Environment of American Classrooms*. Cresskill, NJ: Hampton Press, Inc. p. 223. ISBN 978-1-57273-492-0.
- [22]. Cassidy, Margaret (2004). *Book Ends: The Changing Media Environment of American Classrooms*. Cresskill, NJ: Hampton Press, Inc. p. 224. ISBN 978-1-57273-492-0.
- [23]. Cavanaugh, C (2009). "Effectiveness of cyber charter schools: A review of research on learnings". *TechTrends*. **53** (4): 28–31. doi:10.1007/s11528-009-0302-x. S2CID 150964098.
- [24]. Chen, Na; Yang, Shuili (2022-10-21). Jiménez Macías, Emilio (ed.). "Executive Stock Ownership and Enterprise Digital Transformation: Interest Convergence or Trench Defense". *Discrete Dynamics in Nature and Society*. **2022**: 1–13. doi:10.1155/2022/2956758. ISSN 1607-887X.
- [25]. deJong, T. (2010). "Cognitive Load Theory, Educational Research, and Instructional Design: Some Food for Thought". *Instructional Science*: 38.
- [26]. Dieker, Lisa A.; Lane, Holly B.; Allsopp, David H.; O'Brien, Chris; Butler, Tyrann Wright; Kyger, Maggie; Lovin, LouAnn; Fenty, Nicole S. (7 April 2009). "Evaluating Video Models of Evidence-Based Instructional Practices to Enhance Teacher Learning". *Teacher Education and Special Education*. **32** (2): 180–196. .
- [27]. Elaine, Gereluk, Dressler, Roswita; Sandra, Eaton, Sarah; Dianne; Dressler; Becker (April 30, 2017). "A rural education teacher preparation program: course design, student support and engagement". ERIC: 1–15.
- [28]. Forehand, M. (2010). "Bloom's Taxonomy. From Emerging Perspectives on Learning, Teaching and Technology". Archived from the original on 5 July 2008. Retrieved 25 October 2012.
- [29]. Friess, Erin; Lam, Chris (October 2018). "Cultivating a Sense of Belonging: Using

- Twitter to Establish a Community in an Introductory Technical Communication Classroom". *Technical Communication Quarterly*. **27** (4): 343–361. doi:10.1080/10572252.2018.1520435. S2CID 149660410.
- [30]. Gail S. Thomas (1 February 1988). "Connected Education, Inc". Netweaver. Electronic Networking Association. Archived from the original on 27 August 2008. Retrieved 25 August 2008.
- [31]. Geng, F. (2014). "Confusing terminologies: #e-learning, learning technologist, educational technologist,...discussed by @A_L_T members". Oxford, UK. Archived from the original on 5 August 2018.
- [32]. Graziadei, W. D., et al., 1997. Building Asynchronous and Synchronous Teaching-Learning Environments: Exploring a Course/Classroom Management System Solution Archived 13 June 2010 at the Wayback Machine.
- [33]. Green, Thomas (1971). *The activities of teaching*. McGraw Hill.
- [34]. Hall, Ashley A.; DuFrene, Debbie D. (June 2016). "Best Practices for Launching a Flipped Classroom". *Business and Professional Communication Quarterly*. **79** (2): 234–242. doi:10.1177/2329490615606733. ISSN 2329-4906. S2CID 61904212.
- [35]. Harasim, L., Hiltz, S., Teles, L. and Turoff, M. (1995). *Learning Networks: A Field Guide to Teaching and Learning Online*. Cambridge, MA: MIT Press.
- [36]. Hartl, Eva and Hess, Thomas, (2019). "IT PROJECTS IN DIGITAL TRANSFORMATION: A SOCIO-TECHNICAL JOURNEY TOWARDS TECHNOCHANGE". In *Proceedings of the 27th European Conference on Information Systems (ECIS)*, Stockholm & Uppsala, Sweden, June 8–14, 2019. ISBN 978-1-7336325-0-8 Research Papers. https://aisel.aisnet.org/ecis2019_rp/162
- [37]. Heine, C.; Gerry, J.; Sutherland, L. S. (2015). "Chapter 14: Technology Education for High-Ability Students". In Dixon, F. A.; Moon, S. M. (eds.). *The Handbook of Secondary Gifted Education*. Waco, Texas: Prufrock Press, Inc. pp. 369–392. Archived from the original on 30 July 2020. Retrieved 1 January 2019.
- [38]. Hergenhahn, B.R. (2008). *An Introduction to the History of Psychology*. Belmont, CA: Wadsworth Cengage Learning. p. 627. ISBN 978-0-495-50621-8.
- [39]. Herold, Benjamin (5 February 2016). "Technology in Education: An Overview". *Education Week*. Archived from the original on 1 November 2016. Retrieved 31 October 2016.
- [40]. Hess T, Matt C, Benlian A, Wiesböck F. Options for Formulating a Digital Transformation Strategy. *MIS Quarterly Executive*. 2016;15(2):123-139.
- [41]. Hickey, Ryan (12 May 2014). "The history of online education". Peterson's. Archived from the original on 19 March 2018. Retrieved 19 March 2018.
- [42]. Hiltz, S. (1990). "Evaluating the Virtual Classroom". In Harasim, L. (ed.) *Online Education: Perspectives on a New Environment*. New York: Praeger, pp. 133–169.
- [43]. Hornby & Lafaele, Garry & Rayleen (February 2011). "Barriers to parental involvement in education: an explanatory model". *Education Review*. **63**: 37–52.
- [44]. Hwang, G. J. (2014). Definition, framework, and research issues of smart learning environments—a context-aware ubiquitous learning perspective. *Smart Learning Environments*, 1(1), 1-14.
- [45]. Irby, Beverly; Brown, Genevieve; Lara-Alecio, Rafael; Jackson, Shirley (2013). *Handbook of Educational Theories*. Charlotte, NC: IAP. p. 105. ISBN 978-1-61735-866-1.
- [46]. J. Bransford; A. Brown; R. R. Cocking, eds. (2000). "Technology to support learning". *How people learn: Brain, mind, experience*. Washington, DC: National Academies Press. pp. 206–230.
- [47]. Jack Grove (22 June 2017). "TEF: 'meaningless' results 'devoid of credibility', says v-c". *Times Higher Education*.
- [48]. Jack Grove (8 June 2017). "Will teaching excellence framework shatter old hierarchies?". *Times Higher Education*.
- [49]. Jaggars, S. S.; Edgecombe, N.; Stacey, G. W. (2013). "What we know about online course outcomes (research overview)".

- Community College Research Center. Archived from the original on 4 April 2016. Retrieved 2 April 2016.
- [50]. Joe Banfield (22 June 2017). "Durham University fires pure sass in spicy email announcing it will contest silver TEF rating". *The Tab*.
- [51]. John Morgan (15 August 2017). "UEA upgraded to gold in teaching excellence framework on appeal". *Times Higher Education*.
- [52]. Johnson, Henry M (2007). "Dialogue and the construction of knowledge in e-learning: Exploring students' perceptions of their learning while using Blackboard's asynchronous discussion board". *European Journal of Open, Distance and E-Learning*. **10** (1). Archived from the original on 16 November 2012. Retrieved 22 October 2013.
- [53]. Kane, Gerald; et al. (14 July 2015). "Strategy, not Technology, Drives Digital Transformation". Archived from the original on 2015-07-17. Retrieved 9 October 2021.
- [54]. Kaplan, Andreas (2017). Rishi, Bikramjit; Bandyopadhyay, Subir (eds.). "Academia Goes Social Media, MOOC, SPOC, SMOC, and SSOC: The digital transformation of Higher Education Institutions and Universities". *Contemporary Issues in Social Media Marketing*. Routledge. doi:10.4324/9781315563312-2.
- [55]. Kaplan, Andreas (6 April 2021). *Higher Education at the Crossroads of Disruption: the University of the 21st Century*. ISBN 978-1-80071-504-2. Archived from the original on 29 January 2021. Retrieved 14 April 2021.
- [56]. Kimme Hea, Amy C. (January 2014). "Social Media in Technical Communication". *Technical Communication Quarterly*. **23** (1): 1–5. doi:10.1080/10572252.2014.850841. ISSN 1057-2252. S2CID 219641115.
- [57]. Robinson, Rhonda; Molenda, Michael; Rezabek, Landra. "Facilitating Learning" (PDF). *Association for Educational Communications and Technology*. Archived (PDF) from the original on 22 September 2015. Retrieved 18 March 2016.
- [58]. Rosenberg, Richard (2004). *The Social Impact of Computers*. Amsterdam: Elsevier Academic Press. ISBN 978-0-12-597121-8.
- [59]. Rosenberg, Richard (2004). *The Social Impact of Computers*. Amsterdam: Elsevier Academic Press. p. 219. ISBN 978-0-12-597121-8.
- [60]. Rowan, Roy (1983). Executive Ed. at *Computer U*. *Fortune*, 7 March 1983; Feenberg, Andrew (1993). "Building a Global Network: The WBSI Experience", in L. Harasim, ed., *Global Networks: Computerizing the International Community*, MIT Press, pp. 185-197.
- [61]. Saettler, P. (1990). *The Evolution of American Educational Technology*. Englewood, CO: Libraries Unlimited.
- [62]. Sean, Allan (25 September 2020). "How Covid-19 brought the University of Toronto Class of '24 Together Online". Brooke Godfrey. Archived from the original on 9 August 2021. Retrieved 9 August 2021.
- [63]. Seels, B. B., & Richey, R. C. (1994). *Instructional technology: The definition and domains of the field*. Washington, DC: AECT.
- [64]. Seely Brown, John; Adler, Richard P. (2008). "Minds on Fire: Open Education, the Long Tail, and Learning 2.0" (PDF). *Educause Review* (January/February 2008): 16–32. Archived from the original (PDF) on 16 July 2014. Retrieved 20 November 2014.
- [65]. Seginer, Rachel (Spring 2006). "Parents' Educational Involvement: A Developmental Ecology Perspective". *Parenting: Science and Practice*. **6**: 1–48.
- [66]. Selwyn, N. (2011), *Education and Technology: Key Issues and Debates*, London: Continuum International Publishing Group
- [67]. Sendall, P; Ceccucci, W.; Peslak, A. (December 2008). "Web 2.0 Matters: An Analysis of Implementing Web 2.0 in the Classroom". *Information Systems Education Journal*. **6** (64). Archived from the original on 29 November 2014. Retrieved 20 November 2014.
- [68]. Shi-Chun, Du; Ze-Tian, Fu; Yi, Wang (2014). *The Flipped Classroom—Advantages and Challenges*. Atlantis

- Press. pp. 17–20. doi:10.2991/etmc-14.2014.3. ISBN 978-94-6252-008-0.
- [69]. Skinner BF (1965). "The technology of teaching". *Proceedings of the Royal Society B: Biological Sciences*. **162** (989): 427–43. Bibcode:1965RSPSB.162..427S. doi:10.1098/rspb.1965.0048. PMID 4378497. S2CID 144957844.
- [70]. Skinner, B.F. (1954). "The science of learning and the art of teaching". *Harvard Educational Review*. **24**: 86–97.
- [71]. Skinner, B.F. (1958). "Teaching machines". *Science*. **128** (3330): 969–77. Bibcode:1958Sci...128..969S. doi:10.1126/science.128.3330.969. PMID 13592277. and others see "Dr. Burrhus Frederic Skinner: A Bibliography" (PDF). bfskinner.org. Archived from the original (PDF) on 17 December 2008.
- [72]. Skinner, B.F. (1968). "The technology of teaching". *Proceedings of the Royal Society B: Biological Sciences*. New York: Appleton-Century-Crofts. **162** (989): 427–43. Bibcode:1965RSPSB.162..427S. doi:10.1098/rspb.1965.0048. PMID 4378497. S2CID 144957844. Library of Congress Card Number 68-12340 E 81290.
- [73]. Spector, Jonathan Michael (16 October 2014). "Conceptualizing the emerging field of smart learning environments". *Smart Learning Environments*. **1** (1). doi:10.1186/s40561-014-0002-7. S2CID 3745158.
- [74]. Strauss, Valerie (22 September 2012). "Three fears about blended learning". *The Washington Post*. Archived from the original on 16 July 2017. Retrieved 26 August 2017.
- [75]. Suppes, P. (19 May 1971). *Computer Assisted Instruction at Stanford* (PDF) (Report). Archived from the original (PDF) on 17 July 2010. Retrieved 4 September 2015.
- [76]. Suppes, P.; Jerman, M.; Groen, G. (1966). "Arithmetic drills and review on a computer-based teletype" (PDF). *The Arithmetic Teacher*. **13** (4): 303–309. doi:10.5951/AT.13.4.0303. Archived from the original (PDF) on 5 March 2016. Retrieved 4 September 2015.
- [77]. Termos, Mohamad (2012). "Does the Classroom Performance System (CPS) Increase Students' Chances for Getting a Good Grade in College Core Courses and Increase Retention?". *International Journal of Technologies in Learning*. **19** (1): 45–56. doi:10.18848/2327-0144/cgp/v19i01/49144.
- [78]. The Competences for Community Learning & Development, 2009 seen at "Competences for Community Learning and Development". Archived from the original on 2012-12-24. Retrieved 2009-12-11., CLD Standards Council Website.
- [79]. Trentin G. (2010). *Networked Collaborative Learning: Social Interaction and Active Learning* Archived 17 September 2018 at the Wayback Machine, Woodhead/Chandos Publishing Limited, Cambridge, UK, ISBN 978-1-84334-501-5.
- [80]. Unesco (5 March 2020). "Distance learning solutions". Archived from the original on 31 March 2020. Retrieved 11 May 2020.