Four Trends Shaping More Agile Education Innovation Leadership in Thailand - and Beyond

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Abstract

The purpose of this paper is to support next generation innovation leader development by exploring four major trends shaping education in the remainder of the 21st century. First, we explore the shift in leading organizations from stand-alone, more isolated institutions to offer tactics for developing more partnered, relationship-based structures. Second, we trace a powerful instructional leadership trend away from instructor-centered to participative learning, with strategies for designing and leading learning. Next, we expose an education technology leadership trend from innovation (apps) adoption to experiment-driven adaptation, with concepts for leading emergence. Finally, we examine a global trend toward inclusive, equitable education systems so we offer some ethical and moral approaches for leading innovation - with heart.

Keyword: Innovation, Leadership, Technology, Organization, Instruction, Design, Adaptability, Ethics

1. Introduction

"A diverse ecosystem will also be resilient because it contains many species with overlapping ecological functions... a diverse community will be able to survive and reorganize itself... the more complex its pattern of interconnections, the more resilient it will be [1]."

In this paper we prepare a new generation of education innovation leaders by exploring four trends shaping education system leaders of (1) organizations, (2) learning, (3) technology and innovation and (4) inclusion. Education organizations and institutions (universities and schools) exist within ecosystems [2] so when these systems innovate, they impact more than

Innovators in education university and schools are, by definition, leaders of systemic change in education - so we need capabilities to lead in a rapidly changing education landscape where relationships, not just structures mean getting results that last [5].

Amid some major shifts in education leader thinking already under way, the COVID19 pandemic disruption has amplified both old and new education system strengths and weaknesses shaped by leading contemporary institutions, corporations, and governments [6]. We have long known that older models for leadership were not preparing institutions for nimble and adaptable change and that outdated leadership theory was not providing predictable sufficient results for governments, universities and for the publics around the world [7], mostly because most older education organization theories assume that a well-led institution is either in steady-state or stable conditions or that it ought to be so.

The pandemic has shown us that our education institutions, people, and innovations are constantly changing, interconnected parts of an ecosystem - teaching us that a steady state or 'stable' institution is a fantasy. As post structural scholars drawing from chaos and complexity theory, we know that the only stable system in nature is a *dead* system [1]. New approaches to *systems thinking* [8] and new *design thinking* [9], in combination help to conceptualize, design, and to lead more flexible innovation teams where learning attainments help us to lift lives in a turbulent world.

We are learning that last year when COVID19 forced remote (online) learning for billions of learners, professors, teachers and families, most education systems ignored century-old knowledge about education with technology in favor of "emergency online" education that did not use a century of instructional design (ISD) knowledge [10]. A wide range of high and low-quality learning impacts include lower attainments, test pollution and high system anxiety accompanied by students sensing more of both inclusion and exclusion. These mistakes will echo in real and virtual learning education hallways for decades [11]. As the world emerges from the pandemic, we aim here to assist education leaders and innovators toward leading more flexible teams and institutions where technology is an essential part of education.

2. Leading Organization *Trend 1*: From Stand-Alone Institutions to Partnerships

Universities exist to serve our publics. These public and private institutions are part of a complex and changing web of nested subsystems including research teams, departments, faculties, administrative support areas, communities, federal governments, industry, and public service institutions. They consume billions of dollars in revenue and expense each year. However, if we understand organization as a structure with vertical power ruling cascading levels of people hired to perform specialized functions, we end up with a pyramid concept of organization that is the most brittle, difficult type of bureaucracy to change [36].

What can leaders do to change these common, ancient concepts of organization to increase the adaptability of our teams, projects, and faculties so that our innovation work better fits our entire education ecosystem? First, innovation leaders must accept that our work is embedded with advanced technologies and that this effort could thrive with less formal, bureaucratic organization than it does with purely formal lines of reporting where each person in a hierarchy performs a function for a supervisor. We know we cannot change the bureaucracy, but we can shift how we work within it at a smaller scale, in partnerships for example. In poor economic times, publics are likely not to stand for the enormous costs bureaucratic processes adding to record high student fees and debt. *Can we organize better?*

2.1 Limitations for Structured Functional Education Systems

When we create teams, departments or even faculties we organize people so that work and problems can be solved effectively and efficiently. Results are necessary and goals must be achieved, yet lasting results can be elusive. How we organize our hard work with inter-connected arrangements of people matters more now than ever.

An *organization* is defined as a mental model for a structure or space where a collection of individuals works with some rules, assignments, procedures, and relationships [12]. *Formal, stand alone*, *closed* organizations are classic inward facing arrangements of people and processes, often mired in functional bureaucracy. They are driven by hierarchical chains of command and yet we can find forms of these old structures as the norm inside some, if not most universities. Today, organization theory literature trends indicate that many are experimenting with different organization

structures [18], mostly at the team and project level right now, where innovation and quick change are essential for the good of the entire organization.

One example of *structural functionalism* is the separation of information technology (IT) services from faculties of education learning technology departments. Formal organizations structure this way because centralized university services like IT report to another labor specialization process in the university (administration) and they contain highly specialized IT people who do not have the same expertise, for example, as instructional design, pedagogy and education system sensibilities found in faculties of education (with their own) with separate 'chains of command'.

In such *formal* organizations, specialists are always arranged in structured functional *hierarchies* with a lot of process and rules designed to direct transactions, not relations among people. The result is a lot of 'red tape' when partnership or collaboration among functional units (people, departments, divisions, faculties, universities, governments, industry) is necessary. This slows the process, adding enormous process expense. Large universities are a labyrinth of structural functional labor relation structures. Formal organization work consumes a lot of resource (time, energy, and money) to get work done and the result is usually a *closed system* organization acting to reduce interference from 'outside' functions and processes. Risk is detested, change is talked about (but not welcome). Closed systems are not ecosystems – they tend to exclude difference among people and complicate connections among specialized labor in favor of duty, role, and compliance. They can ignore human diversity and social, economic, and political currents happening beyond teams, faculties, and universities while leaders strive for stability, so they work hard to reduce risk in the power structure [13]. The condition can be more than frustrating to innovators when adaptable, quick collaborative innovations that can come from, say Artificial Intelligence informed learner profiling in the design of online learning programs are a possibility. Few closed systems in nature survive independently of their larger environment and so the boundaries created in university bureaucracies have long been linked to the isolation of universities from society. Today, universities are expected to impact and to serve society measurably as integral, not closed systems.

A recent case study of educational technology decision making across a university provides a good example [14]. Mandated by a powerful political leader, university It groups worked with a manufacturer to provide tablets to thousands of students with the hope that they would have better access to the internet for learning. The university IT department added functional groups and services to support tablet learning, however professors soon faced students with tools that needed to be part of instruction and coursework (costing millions of dollars). Professors did not know how to integrate the tool into the learning ecosystem. The result was marginally better access to the internet because the instructors were not part of the organization (IT) that mandated tools, and because IT did not have expertise in pedagogy, learning environment design and instruction mediated with technology. The tablets soon fell into misuse, a common tale of a formal organization mandating leaders to implement at tool but in a formal organization where collaboration was difficult. Formal organizations are the most brittle, change-resistant forms of organization on the planet [3].

2.2 Towards Partnered Relational Education Systems

A subtle paradigm shift toward partnered, more relational, *informal* organization is occurring among innovation partnerships. Examples are familiar, including information technology (IT), pedagogy (Education), administration and learning system design, development (ISD) and implementation where joint work among support centers, faculties,

university administration, industry and government occurs to create programs or training.

New, *relation-based* or "network" organization subsystem structures (teams) created by and among key people who have the right resources and knowledge to solve complex problems gather from across an organization with less formal leadership, creating temporary, high capacity sub organizations. We know how to design high capacity network teams [16], and this emerging trend is reshaping organizations and innovation leadership [15]. Such an open system conceptualization of nested university subsystems increases the 'adaptability space' for our leadership work in universities [15] and it creates a lot of possibility for leaders who know they need to partner with resources and diverse expertise (or money, politics) to develop new programs with new learning with less bureaucratic overhead. Post-pandemic, national budgets may convulse and shrink – so more with less funds might become a norm again soon. Examples of less formal partnered organization include special task forces created by provosts and deans with specific results in mind. Reaching across faculty 'lines' they can attract expertise from across traditional university faculty, department and administrative (IT) boundaries with quick results that occur from collegial work, not just people 'doing their job' (bureaucratic functionalism).

When we lead change and innovation in education, we know that our less structured relational networks allow us to *attract* the right people, for a while, to experiment with us, sometimes outside our 'job descriptions' or 'departments' [3]. Examples ad-hoc student recruiting pilot strategies, temporary task forces and 'hacker' communities. From Google to Netflix and in university labs around the world, many innovation leaders are beginning to study and to understand the power of our *less formal* relationships based more upon *"who you know"* to augment what we can do by sharing "*what we know"* to solve problems as collectives of individuals.

This shift means reconceptualizing some of our university work without the boundaries of formal leadership and organization thinking that are subconsciously, uncritically engrained in leader thinking (more common, though in isolated innovation teams). When we achieve informal network organization with people gathered around problem solving, we can design powerful partnership as relational patterns (decentralized nets) connecting with people our organization boundaries. These are more open systems where *influence*, not power drive experimentation, innovation, and the development of new processes. *High capacity* networked (relational) team patterns have specific design features [ผิดพลาด! ไม่ได้กำหนดบุ๊กมาร์ก] and these networks, if properly designed as decentralized organizations (Figure 1) often span a labyrinth of closed, vertical bureaucratic structures allowing us to lead more nimble subsystems [16]. This section is a high-level overview for leaders who want to organize more flexible teams, or institutional partnerships spanning conventional bureaucratic, cultural, or political boundaries with technology in the fabric of all the work.

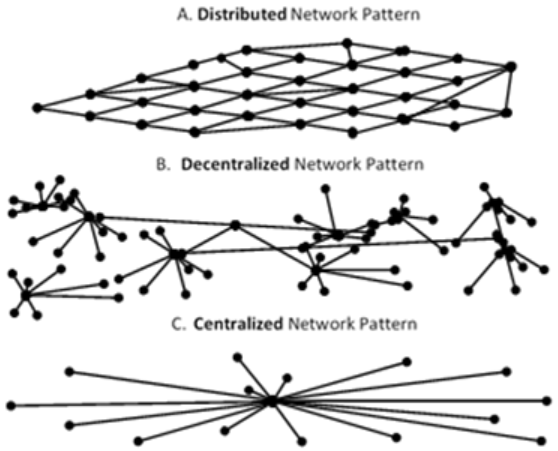

Figure 1: Distributed, Decentralized and Centralized Participatory Teacher, Learner and Leader Network Patterns. Centralized pattern is a hierarchy (all nodes go through the leader to connect to others)

Our understanding of education organizations has evolved from historical presumptions of stable, formal systems to consider less formal, unstable systems with complex, interconnected dynamics knowing that a change in one part of the system affects all other parts of it, similar to the dynamics of ecosystems [17] [18]. Trees do not thrive in a forest where they cannot get sunlight. When we focus on relationships, problem solving and outcomes, we can design open system networks with high capacities to get work done, especially in an innovation space that can learn [16].

For example, when the University of Michigan Provost saw that research on teaching and learning outcome data could be interpreted by analytics to improve student learning, the Provost convened a symposium and a (temporary, networked) Learning Analytics Task Force by drawing people from across institutional boundaries (faculties and administration) who were attracted to the idea of better designed learning environments from well profiled learners. Twelve faculty members showed interest collected with a cross section of disciplines and departments to explore the data analytics environment at UM and to design a funding program to support learning analytics. The result helped learning environment design, but also resulted in a successful fellows program available to any student who want to collect learning analytics skills. As well, there was a rise in cross-institutional research and analytics-driven cultural change where learning analytics has become a driver for change across that university [19]. This is an example of a less formal organization with open systems and tactical networks.

The authors have tested and developed models for designing high capacity network teams[i] and principles for leading partnered change as teams develop innovations [21] While creating flexible innovation relation-based partnerships, next generation innovation leaders must also pay attention to shifts in leading instruction - the second trend shaping future education innovation leaders.

3. Leading Learning *Trend 2*: From Instructor Centered (Industrial) to Participative (Knowledge Era) Teaching and Learning

Good teaching is good teaching. Universities exist to develop human potential through various forms of education, so the leadership of instruction (and its designs) is a responsibility for education leaders everywhere [7]. However, if we understand instruction from an i***ndustrial era paradigm*** where we sort content (curriculum, credits), learners (cohorts, school grades) and time (program hours) to achieve learning we create rigid, i*nstructor-centered* learning that sorts learners into categories and sequences just like formal organizations that sort labor into divisions, production processes.

Today, a global trend toward more social and context-based participative learning in university [7] providing more learners more learner autonomy and critical thinking (*deep learning*) over memorization and skills duplication (*surface learning*) [22]. When we challenge the old industrial learning (surface learning) paradigm we realize that students are also very well interconnected to a vast network of content, learners, instructors, and people on the internet. Upon arrival in university, these students do not expect only learning content from instructors, they expect experiences, problem solving and knowledge-building opportunities [23]. They expect similar life balance and development chances from employers and labor markets. Accordingly, there has been a shift from *industrial age* to *information age* instructional leadership. High potentials from this shift favor leaders who can design *and* lead more informal, partnered, and open community approaches to program design and learning experience design with technology

backbones. Next, we help you map a path from *instructor centered* to *participative teaching* and learning leadership.

3.1 From Industrial Age to Information Age Education Paradigms

Knowing now how to design, develop and lead more nimble network organizations (teams), leaders must also know that instruction and learning in the university is changing on trend with shifting instructional leadership paradigms from *industrial* to *knowledge or information age* learning [24]. Information or knowledge age leaders have a better chance for sustaining systemic education change by integrating learning technologies in more open learning environment mix [27]. In the industrial age of education, we developed learning systems like factory models to suit the needs of a labor-oriented society when:

- Most labor was manual
- There was little demand to educate learners to higher levels
- We could not afford to educate learners to higher levels and
- Few learners would be content with assembly line/agrarian work if we educated them more.

So, to convert human capital into effective labor in tune with industrial society values we organized our classes and education institutions to produce productive workers. We delivered education by teaching a fixed amount of content and curriculum using specific (lecture, drill and practice, master-apprentice) pedagogy within a fixed time via the school grade system. We held time constant for every learner, forcing achievement to vary. We then used norm-based assessment to measure achievement variance among learners. This sorting system placed students into time slices (grades) within fixed spaces with fixed resources, assuming a *static* overall learning environment. The result was stacked, bureaucratic and technocratic administrative processes with instructor centered (lecture) classroom praxis separating teacher and learner curiosities, interests, and diversities [25]. It did not create flexible education systems for the changing societies today where knowledge workers need capabilities for self-regulated learning while they learn with connected computers to develop skills for jobs yet undesigned (i.e.: social media architects, AI Liaisons between IT and faculties).

In the Information Age (now) we know that instructors must move from stocking the learning factory with technology, content, teacher, and resources that work like linear learning production facilities - toward something more like open organizations. Globally, new trends like flexible learning, certification, degree and program options, learner-regulated competence attainment (not just grade and degree) and micro credentials are trends changing the labor development/university processes in many countries [26]. Information age educators create knowledge workers and builders of knowledge as well as the important laborers, technicians, and administrators in our modern technologically integrated society.

Because information technologies have afforded learners higher levels of education more quickly, education leaders need a mindset that is more *learning* focused, and less *sorting* focused. *Design based thinking* [9] along with *systemic change* [3] *and principles of instructional design* [24][27] mean that educational technologies can now be included to enhance robust participatory, less isolated learning where time and lesson content structures can be conceptualized differently. Rather than holding time constant, which forces achievement to vary, we need a paradigm that holds achievement constant at some level of mastery of each standard. This means we must not force a student to move on before attaining the standard, and we must allow each student to move on to the next standard as so as it is attained [24].

To leverage relation-based education leadership, information age *learning leaders* must simultaneously understand education organization to design effective supports for these new trends in open system participative learning. Beyond the scope of this paper, cutting-edge education technology support embedded in faculties like the Faculty of Industrial Education at KMUTT are using learning environment design principles with an ecosystem-like ontology to streamline programs and organizations so that learning and institutional environments are more open and flexible [27]

Leading instruction is a project that is becoming increasingly important in a changing education leadership discipline where universities and governments want results in terms of measurable learning, competency, and labor/skill attainment. *Participative learning* or *problem-based learning* is happening in more student-centered, activity-based social learning contexts enabled by advanced technologies where the technology and pedagogy is constantly changing, so Information age instructional leaders will need to lead innovation, change and pedagogy with teams of transdisciplinary experts.

Deep learning in the information age can occur when students and instructors plan in well-designed organizations led by transdisciplinary teams in technologically enhanced, partnered settings [23]. Refer to our detailed design principles for leading simultaneous: (1) change, (2) high capacity network teams/partnerships, (3) innovation and (4) design of participative school or university education organizations [21].

3.2 Potentials for Vocational Education:

Sethakul and Nattakant remind us that vocational education is a worldwide growth trend requiring action because technology, skill, science, learning, and performance serve emerging labor markets in new ways today [30].

State policy makers and labor economists refer to the the 4th Industrial revolution where in education, information age education paradigm shifts are similarly impacting higher education towards technology-enhanced, adaptable universities [28]. Aligned with national goals to accelerate productive labor development in almost all economies, most governments are developing new training policy along three megatrends: (1) globalization, (2) technology and (3) changes in demographics [28]. Macro level labor planning trends include student demands for lifelong professional development from colleges and universities, digital technology effects on work, labor market structure change and increased vocational training [28]. Educators are impacted by micro trends including sharp calls for effective learning, the use of online lessons and options for skill decay amelioration [29]. Thailand, for example has developed Thailand 4.0 and Education 4.0 strategies along with Japan, China and other countries aiming first at engineer development and then for technical educator development (STEM) so that international collaborations (partnerships) will accelerate education innovations for nation-building service through technological innovation [30].

In Canada and Thailand, governments have accelerated funding for technical college evolution, so they grant both degrees and trades certification with labor and social development in mind. Governments are blurring the traditional, formal (closed system) lines between K-12, college and university learning systems by offering credits and courses that can be earned in high school for college (trades, diplomas) and university degrees in Alberta [31] and Ontario provinces [32]. This is an excellent example of how networked teams can work across sector, institutional and industry boundaries. Education leaders need to know how to lead in this emerging, heavily partnered sector.

Trades and technical education embedded with technology and assisted by big data, artificial intelligence, MOOCs, online and augmented learning – are an important merging new trends for

all higher education around the world. Part of workforce management strategies, European researchers found skill shortages among *content skills* (i.e. reading comprehension, writing, speaking and active listening), *process skills* (i.e. critical thinking and active learning) and *complex problem solving skills* (i.e. instructing and social perceptiveness) [33]. OECD countries report that in the USA, workers are under skilled for most employment requiring numeracy, while they are over skilled for literacy jobs [4]. To achieve workforce planning goals aimed at better, faster and deeper vocational learning from colleges and universities in in every state around the world, innovation leaders will need to lead designs of more open, partnered (less formal), transdisciplinary teams that deliver measurable results in the sector [16]. Vocational education is no longer the work of a lone university faculty or administrative support group - so we must educate our graduate students immediately as future leaders of sustainable vocational education innovation to keep lifting millions of lives [34].

4. Leading Technology & Innovation *Trend 3*: From Adoption to Adaptation

At the rate of change we are experiencing with big data, cloud computing, computing power and other technological innovations, we should ask ourselves: *Is it sufficient for leaders to find and implement innovations in our education systems, or should we focus more on experimentation that develops our organizational potential to keep changing with the times?* Universities focused on innovation and learning with technology face enormous possibilities and challenges as we emerge from a pandemic with unsteady economies, changing societal perspectives about online life and louder, persistent global demand from youth asking for all forms of social justice. We will need to re-design our education institutions and lead innovations so that leaners thrive in this emerging education ecosystem.

The classic *Rogers innovation adoption or S-curve* [35] has been used globally for everything from assessing technology enhanced degrees employing simulations to long range strategic planning and budgeting in our universities. But the early, middle, and late 'adopter' situations [Figure 2] we design using this curve always seem dependent on so many unknown factors, not the least of which is an elastic time scale (on the S-curve) making planning adoption difficult. The market-based adoption (s) curve has outlived its utility. It has, however created an addiction, particularly among education technology innovation leaders to focus on 'buy in' or early, middle, and late adoption - rather than to demonstrate the power of innovation and its results can improve learning outcomes. Innovation, in education is most often used to describe piecemeal change labeled as innovation, sadly, so next generation leaders need to know the difference. This section invites innovation leaders to consider a shift of focus from leading adopting technologies as 'road ready' instruments in education toward leading the systemic creation of more adaptable teams, groups or organizations capable of adapting their education system for true ***innovation*** via the *creation of new products and processes* (genuine organizational transformation).

4.1 From Formal to More Informal Innovation Leadership

We argue that partnered organizations and leadership can create agile education design and delivery ecosystems in a constantly changing world. Next, we explore a complementary mindset change necessary for innovation leaders [5].

4.2 From Adoption to Adaptation: A Search for Experimentation, not Applications

When we think of innovations, most people think of the Rogers (1963) Innovation adoption model or S-Curve. Simplifying here for parsimony, the Rogers model (Figure 2) presumes steady-state,

closed system market conditions in stable organizations attempting to implement (adopt) an 'app' or 'widget' for better institutional results. In fact, most technology 'apps' are loosely called 'innovations' today - but Rogers and organization innovation scholars make clear that innovations don't just change operations within a part of an organization.

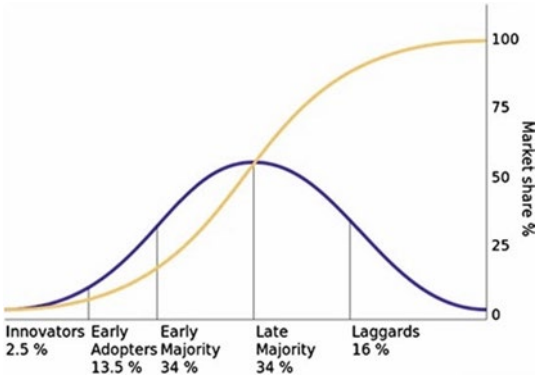

Figure 2: The Innovation Diffusion Curve (Rogers 1962). (Source: https://commons.wikimedia.org/wiki/File:Diffusionofideas.PNG)

Deep innovation transforms both the process and product of an organization. It is a better goal than 'adoption', because adoption means implementing a proven-fit, successful (in the ecosystem / organization context) technology.

One example of deep innovation is a well-designed online graduate education leadership program that we co-designed at the University of Calgary 15 years ago. Our traditional graduate degrees provided access only to people who could live in Calgary to complete on-campus degrees, thus excluding many working leaders bound to a location by income. We wanted to globalize our leadership program so that graduates could also learn from each other from the different cultures they live in around the world. By Experimenting with a fully online and then a blended program took years of evidence-based co-design in instructional design, learning platform, admissions, graduate policy and supervision among the leadership department, education faculty, university IT and amin, and school districts, universities around the world.

There were plenty of 'apps' and technology platforms suggested as 'adoption-likely' solutions along the way. But we experimented with laddered master's certificates, diplomas and degrees, and a blended online Education Doctoral degree in leadership which eventually expanded to Ed.D. degrees in six other education disciplines. When COVID19 and state policy drove university learning online, our graduate program continued virtually unaffected.

We did not find an 'app' or one solution in IT, instructional design, leadership, or university policy making to do this. We did not use the Rogers S-curve to 'hope' for early adopters, middle adopters, and late adopters. We budgeted for constant improvement, and staff accordingly. With new values and the purpose of inclusion driving our leadership, we experimented with program design, delivery, and technology, using research and evidence to guide us along. The result is a genuine innovation in terms of graduate skills, experience, and instructor/supervisor evolution in our EdD programs, which are continuously improving. We had to fight back the impulse to buy one platform (widget), one design method, one marketing method or other falsely termed 'innovations' that all promised a panacea for us. We *co-evolved as a network organization*, and this gave the entire faculty financial strengths too.

Innovation is constrained by formal organizations that are closed systems. In the example above you see evidence that it takes informal, distributed leadership (shared influence) across a system (university) to allow a new product and process (innovation) to emerge.

Change management, by contrast leads to incremental or piecemeal change and not to systemic change so apps, widgets, and small-scale solutions (tech) work in those settings.

By Using complexity theory in both organization design and education systems (learning environment design, education innovators can lead within complex, changing ecosystems in the ways we have explored in this article. But the key for

innovation theorists is not to expect adoption stages for applying a technology alone, or to plan 'disruption' based on a market model that would attract people to a new market or widget (Christensen 1997). Leading innovation means leading emergence for the institution, team, or unit.

Leading Deep innovation that changes education institutions (and all organizations) emerges [36] in four stages: (1) a disequilibrium stage; (2) amplification stage; (3) recombination stage and (4) stability/feedback stage. Explained in detail elsewhere [5], the key for future leaders leading emergence (via innovation) in each stage is to:

1. *identify* the *tensions* found in an organization disequilibrium state (we are not going where we want to go) and identify *experiments* leading to new processes and products

2. *test and pilot* the experiments considering sustainability

3. *amplify* the experiment so that it becomes institutionalized and

4. when the institutionalization is complete, watch for feedback that the processes and product need to *change*, and consider another to stage 1.

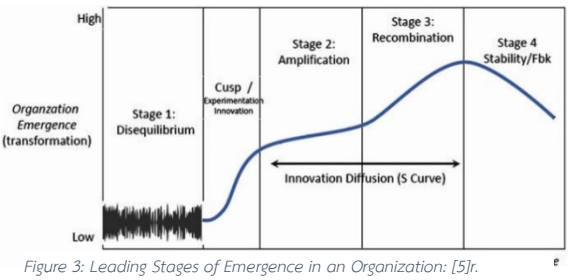

Figure 3: Leading Stages of Emergence in an Organization: [5]r.

Figure 3 [5] shows the process of leading emergence via an innovation in an education (or other) institution.

A practical, perhaps humorous example follows, demonstrating the stages of emergence for technology-embedded solutions and learning.

Stage 1: *Disequilibrium*. During research team trips in the car, one author noticed that collaborative paper map-reading to find locations in unknown cities took longer when we lost our way. This created disequilibrium and productive *tension* among the team in the car, so the team mused about another way to travel. Research assistants had navigation duties and disequilibrium threatened to become chaos when getting lost affected personal lives that evening. Buying his (first) new up-to-date vehicle, the author tried an *experiment* by adding an onboard GPS system to ease navigation and trip-quality tensions. This was the *cusp of change*. Importantly, the leader (driver, author) recognized that this experiment worked to reduce travel navigation tensions and tensions from missed appointments. We needed to change the way we travel.

Stage 2: *The Cusp: Testing*. Over the next year, the automobile GPS was used for every trip meeting. The team missed no meetings, travel was efficient and more effective.

Stage 3: *Amplification*. It became common practice to employ GPS and address searches before research trips. Overnight, GPS usage replaced paper maps in the car. The researcher (lead) implemented a policy that all research vehicles would use GPS for navigation. (Note: there was not early, middle or late adoption of the GPS 'app', no 'stages of adoption).

Stage 4: *Feedback/Stability/Decay:* Using a technology, from recognizing team (network) tensions changed the process and product of research team navigation. Now we find that long trips still prevent working in the car or sleeping for tired researchers. An emerging disequilibrium is occurring as young researchers realize AI piloted autonomous vehicles are on the horizon, and they want one. Feedback is indicating that the current GPS solution is limited, and that, when possible, we will experiment with self-driving vehicles. Plans are in the works.

In education, our quest for adoption of technology embedded learning has some us to misunderstand that often a technology or 'app' is a solution to a small part of the education

problem, ignoring the open institution and ecosystem that will assure its sustainability. In *formal* hierarchical organizations, we can force adoption, and motivate people to become 'adopters' more by excluding them from the group than by individual motivation. A different journey toward emergence with i*nformal organization* allows us to recognize more fundamental problems in our education ecosystem, to take risks and enjoy generative tensions to create experiments to solve problems, and then to use adoption curve logic to institutionalize innovation can work.

5. Leading with Heart *Trend 4*: Towards Inclusion

A fifth trend shaping education innovation powerfully is a global cry for inclusion, equity and social justice so that learners and team members feel better about working together. Inclusion, diversity and equity is a huge issue in our post-pandemic world [37].

Public pressure within the education ecosystem is already changing policy, funding and politics in public (and private) education systems. A shift toward more inclusive innovation teams will be easier if we are leading with heart [38].

Nothing could be more important for leaders creating innovative partnered teams in the post-pandemic world. To lead more adaptable, relation-based teams we know that a moral compass is crucial for everyone, especially for innovation leaders. At the dawn of affordable artificial intelligence, here to help us lead innovation with heart.

We begin with the development of an ethic to help nascent innovation in more relation-based, agile partnerships without fear so that partnered work results in inclusive teams and inclusive learning environments made stronger by diversity [16]. Leaders must be (more) aware of the diversity and interconnected publics we serve as education innovators [16]. The largest single barrier to innovation team impact in education systems today is a lack of teacher and learner trust in the technologies (tools), particularly when Artificial Intelligence is a subject [39].

With classroom service robots and AI augmented learning environment design already on the horizon emerging from Big Data and cloud computing, education innovators working on 'apps' and 'adoptions' can be seen as too far-removed from the everyday hearts and hopes of learners who have traditionally learned most comfortably in warm, trusting professional learning *relationships* with teachers and professors. As leaders of relational organizations, we need to keep that trust in relational organizations integrated with educational technologies. A dilemma faced by education innovators in a healthy, trusted organization is the introduction of tools and technology that mediates relationships among learners, instructors, and others (as in online learning). While we experiment with well-designed innovations under development, we need to watch our moral compass too. It is illogical to say that AI will result in robots that will rise and kill us all or take teacher jobs, therefore we don't need them in class. There are tactics that leaders can use to assure experimentation while keeping our heart and ethics close to mind.

First, when we are experimenting or leading a new process or technology that will require field testing before implementation by those we serve (teachers, learners, faculties, universities, companies), we need to be conscious of our conduct more than being 'right or wrong'.

For this example, imagine that education innovation leaders are designing and implementing student plagiarism detection software. We can take an ethical or moral approach to making decisions as we lead. Morality is the right or wrong of an action or decision [40]. In our example, students may take a moral approach to judge the good or bad of plagiarism software. If the software reminds them that they might be missing a source attribute in a paper, they might think this good. If the

software is used by an instructor to flag cheating (academic misconduct), and if we connect that system to the registrar's office to file an academic conduct complaint automatically, students might find this to be bad, because the system is punishing (doing harm) without reason. Moral discussions (good vs. bad) can be harmful to innovation development with a nascent innovation that is not fully complete or understood.

Ethics is about human *conduct* [41] where we apply standards to propose or to judge human conduct or behavior. When concerned with human conduct in the context of an innovation decision, we can take an ethics approach to judge if an action is *right or wrong*. For example, when an innovation leader decides to allow our (in test mode) intelligent tutor to connect to the university policy definitions and to the registration system to expel a student for not citing a source in a paper. This conduct, on our part would be wrong because it causes harm without considering the value of care or 'do no harm'.

An ethics approach when leading nascent or emerging innovations can be more helpful to leaders because it allows us to be guided by principles and values like our professional duty of care, and respect for persons (Kant) values to make a right or wrong (conduct) decision, rather than to just impose 'good or bad' judgements. This is explored in detail on our paper on AI and robots in the classroom [39]. Education innovation leaders will need good grounding in ethics education for the remainder of this century when AI becomes another 'partner' in our relational organization.

For example, a new leadership program [42] at the University of Calgary (Leadership, Policy & Governance Specialization) is "Leading with Heart", a certificate program that can be used in master's degrees. The case-based signature pedagogy program is designed to give education (innovation) leaders exposure to the principles of educator *wellness* and *mindfulness*, as well as to develop a philosophy for leading so that from a self-analysis of education values, relational leaders can build *trust*, *courage* [43] and *care* strategies into their work. Other ways of knowing, such as *Buddhist psychology* [44] and leader *visioning* strategies comprise the core "Leading with Heart competencies". Much more must be done to develop and to prepare education innovation leaders in different institutional and global cultures where team relations matter.

6. Conclusion

We have explored four major trends that shape education innovation leadership today, providing sources, models, and tips for next generation leaders in a more turbulent post-pandemic world. We urge education innovation leaders to consider a broader view of *organization* to include the university ecosystem and its interconnected parts, connections and partnership work moving leadership away from labs, departments and stand-alone faculties or universities. From a close look at systemic change research, we indicate a shift toward emergence – where leaders recognizes *tensions* and support experiments to create new processes and products for deep innovation (not piecemeal improvement schemes) as we lead technology-embedded, constant flux participative and problem based learning ecosystems. Finally, we explored how important it is for leaders to know their own moral compass, and to use *ethics* to serve a more diverse, partnered, open university innovation world to lift lives including more people. We are full of hope as we conclude, realizing that the next generation of leaders can be much more agile than the last.

7. References

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